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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Chemical Industries of Europe

FROM a comprehensive review of the conditions of chemical industry in the United States and the principal countries of Europe, which is published in the current issue of *The European Commercial*, it appears that, in spite of the general difficulties of trade, there are signs of improvement, with many extensions either actually in progress or contemplated, and keen concentration on the development of new processes.

One of the features of the United States is the expansion of the chemical exports. Foreign sales of American coal tar products for the first quarter of this year show an increase of 5 per cent. over the corresponding period of 1922. The increase was principally in crude products. The value of intermediates, however, doubled, and finished coal tar products increased over 30 per cent. Important gains and some losses as to values occurred in the exports of heavy and fine chemicals during the year. The biggest advance was in bleaching powder (68 per cent.) and the heaviest loss in calcium carbide (63 per cent.). An increase of 19 per cent. was recorded in foreign shipments of medicinal and pharmaceutical preparations, but slightly smaller quantities of sulphuric and boric acids were sent abroad during the first period of this year. The quantities of wood and denatured alcohol shipped to foreign countries were almost double. The returns show a steadily increasing demand in foreign countries for American perfumery cosmetics and toilet preparations. Shipments of sulphate of ammonia and other nitrogenous fertilisers fell off considerably. In such substances as resin and spirits of turpentine the United Kingdom is reported to have been the best customer.

The German chemical industry is reported as showing a distinct change for the worse. The decline in exports includes dyestuffs, pharmaceutical products, and artificial fertilisers. Moreover, from all the reports published by the chemical factories, it appears that profits, if calculated on a gold mark basis, are far below those of last year and immensely lower than those of pre-war years. There is a growing tendency to quote the dividends in gold marks in place of paper marks, but scarcely a single German chemical factory has been able to show a dividend exceeding 60 gold pfennigs. Concentration in the German chemical trade still continues. There is a reduction in the number of concerns compared with pre-war years, whereas the number of employees has greatly risen. The most favourable aspect of German export trade is the increasing export of dyes to China, Japan and East Asia.

It is claimed for chemical industry in France that remarkable progress has been made since the war. The 625,000 tons of soda prepared almost exclusively by Solvay was formerly sufficient for French consumption, and about 100,000 tons were exported principally in the form of carbonate and caustic soda; but the reincorporation of Alsace-Lorraine has augmented the production to 150,000 tons, thanks to the development of the Solvay establishments. Electrochemistry has been considerably developed, and the output of calcium carbide has increased from 40,000 to 50,000 tons in 1913 to about 200,000 tons to-day. It is claimed that the Claude process makes possible the production in the mines of Bethune of 10 tons of sulphate of ammonia daily. The Government has also organised a large factory for the production of synthetic ammonia according to the Haber method, and it is estimated that France should shortly be able to supply 250,000 tons of ammonia salts annually. Regarding dyes and colouring matter it is anticipated that, in spite of difficulties, the French industry will in future years be independent of Germany for its supplies. In the synthetic industries France's manufacturing capacity supplies her own needs, but she still has to import much raw material. Her position shortly is described as not so good as that of Germany but better than that of England or the United States.

Hungary, as a result of the war, lost the chemical industries connected with timber—wood distilling, cellulose, and tanning material. Further, soda, chlorine, chloride of lime, sulphuric acid, tartaric acid, and resin are no longer produced there. The principal cause of the decline is the difficulty in obtaining raw materials. The decline is not regarded as permanent, and efforts are being made to adapt factories for the production of new articles. The reports on Italy indicate important developments in the fertiliser industry, including a new factory at Venice for the production of super-phosphate. The Montecatini Co. is paying great attention to the production of nitrate and cyanamide. The synthetic ammonia installations at Novara have recently been completed, and satisfactory results are said to be obtained from the Fauser patent. The attempts to obtain nitrogen from the air by the Casale and Fauser processes, which are expected to lead to definite results within the next few months, are estimated to produce about 2,500 tons of nitrogen annually. In Russia the situation from the chemical standpoint is uncertain, but in Czecho-Slovakia chemical enterprise is active, and supplies are being produced both for home and for foreign markets.

British Dyestuffs

In the statesmanship review of the work and position of the British Dyestuffs Corporation which Sir William Alexander presented to the annual meeting this week, there was comparatively little said about the minute technicalities of the industry, though the chairman's knowledge of chemical principles is probably more than equal to that of many of his critics who are constantly harping upon technical control. There was, however, in the statement, something much more valuable—a clear and proportioned vision of the place which the dyestuffs industry holds in relation to both national and trade interests, a resolute determination to carry a difficult and anxious task through to success, and a record of progress which is full of encouragement for the future. On previous occasions we have claimed that the responsibilities which Sir William Alexander undertook entitled him and his colleagues to the loyal support of all who consider the interests of British industry before those of foreign competitors. The results have more than justified the confidence placed in them, and the nation will cordially endorse Sir William's hope that when he vacates his onerous position he will see the shares of the company standing at 20s. in the pound and the nation possessed of a vital national industry.

For the details of Sir William Alexander's statement the reader must be referred to the full report on another page. It would be difficult to put so large and complex a case in clearer terms. The first point to be emphasised is the astonishing progress in the scientific and productive sides which the British industry has made. Beyond all other objects originally in view was the establishment of a British industry which should never have been allowed to leave this country. The progress made has exceeded what anyone would have ventured to predict a few years ago. Since the last annual meeting, the Corporation has placed on the market, in addition to twenty-one improved brands, no fewer than forty-five new colours equal to the best German type. In matters of price, again, the consumer is indirectly being protected against exploitation by German makers. For example, in March, 1922, the Corporation introduced a vat colour in competition with the German product, which was then selling in powder form at 68s. per lb. The British colour was introduced at 45s. a lb. The effect of the British competition has been to reduce the German price to 34s. a lb. One can readily see from a few such instances as these what the position of the British consumer would be if he were solely at the mercy of the German producer. In the last four years a total sum of £400,000 has been spent on research, and that is work from which not merely the company benefits but the whole country and the profession of chemistry in general. But all this means not only money, but time. In addition to research, what is needed is the practical working experience on which a great industry is built up. By degrees, and far more rapidly than might have been expected, all these things are being done, and the financial results, though yet far from yielding a reasonable return to the shareholders, are promising. The general position may be summed up as one of remarkable achievement in the face of constant difficulty, of courage and business capacity gradually producing their due effects, and of prospects which year by year are consistently getting better. Those in charge are entitled to the congratulation and support, and, we believe, while allowing for reasonable criticism on details, that the nation is loyally behind them in their efforts to put the British dyestuffs industry in the place it should properly occupy.

Increased Ammonia Production

Dr. T. Lewis Bailey's recently issued report on the conduct of British alkali and other works is not only interesting from the point of view of the technical information which it contains, but if it is carefully read it will be found to give a useful indication of the trade conditions which prevailed in the heavy chemical industry during the past year. The Chief Inspector speaks hopefully of the future, and he regards the fact that new methods of manufacture are being introduced as an indication that the worst of the depression has really been left behind. Normal conditions had by no means been re-established by the end of the year, and a comparison between the number of registered works which were in operation during 1922 and 1921 shows that the process of elimination which started with the end of the war still continues. It is, of course, not possible to judge how many of those works which have ceased operation have been permanently shut down and dismantled or how many of them are merely marking time until conditions in the heavy chemical trade warrant a fresh start. It has frequently been stated that the sulphuric acid industry may be taken as a reliable barometer of the state of the chemical industry in general in this country, and for this reason it is disappointing to find that Dr. Bailey has once again omitted to include in his report that comprehensive table showing the actual number of individual processes which his predecessors always gave. The absence of this table makes it impossible to judge of the conditions relating to the demand for specific

industrial chemical products. We are, however, provided with the usual statistics relating to ammonia compounds, the most significant disclosure being the considerable increase in the output which took place last year, and for which, no doubt, the demand for sulphate of ammonia was mainly responsible. Taking England, Wales and Scotland, it is noticed that whereas in 1921 the total quantity of ammonia products manufactured was 250,571 tons, in 1922 the quantity was no less than 351,142 tons, an increase in output amounting to over 40 per cent. The cause for this rather startling progress can primarily be traced to the coke-oven undertakings, from which the output seems to have been more than doubled. Bearing this in mind, it is not difficult to draw conclusions as to the improvement which occurred in the iron and steel industries as compared with that distressful year 1921. So far as recovered ammonia is concerned, however, we are still some distance from the 1914 output, which was no less than 426,000 tons; and it is not altogether pleasant reading to find in the report for Scotland that "at some works it was thought advantageous to run ammoniacal liquor to waste rather than to recover the contained ammonia." Dr. Bailey should, however, have further considerable improvement to record when he comes to collect the data for the present year, for the export demand for ammonia products seems to bear a more cheerful complexion than for some time past.

Annual Reports on Applied Chemistry

We have recently received for notice a copy of the volume issued by the Society of Chemical Industry containing the customary reports in which is recorded the progress made, and outstanding events which occurred in the more important branches of applied chemistry during the past year. On previous occasions we have pointed to the value of this work which the Society undertakes, for year by year the reports provide us with supplements to our standard text-books, and the labour involved in keeping abreast of development is thereby considerably minimised. Although we are glad to be able to subscribe our usual meed of praise for the manner in which a difficult and arduous task has once again been brought to a successful conclusion, we still feel that there is room for improvement so far as the date of publication is concerned. To the majority of technical workers the value of such information lies in its absolute freshness, and many opportunities may be lost if it is at least six months out of date when it becomes available.

A glance at the list of contributors is sufficient to show that in compiling the volume the Society has the support of the most authoritative workers in chemical industry, who are faced with the task of consulting an enormous mass of English and foreign literature. The present is the seventh consecutive volume which has been published under the editorship of Mr. T. F. Burton; and the particular branches of applied chemistry are sub-divided as in the previous year, with the exception that on this occasion explosives are not dealt with, while the subject of refractories has not yet received separate treatment, but has been embodied with ceramics and building materials. It may be noted that out of the twenty-four individual contributors no fewer than thirteen were responsible for the same subjects the previous year. It may be added that the purchase of the book is not confined to members of the Society. Non-members may obtain it, although the charge to them (12s. 6d.) is five shillings more than the cost to members.

The Fauser Synthetic Ammonia Process

The account published this week of the recently established synthetic ammonia and nitric acid plant at Novara in Italy is of considerable interest, as up to now little has been heard of this process in England. A study of the plant reveals that the method is closely allied to the Haber and Claude processes in principle, while the fact that the working pressure is 300 atmospheres shows that of the two previously established methods it is more closely related to the Haber. The outstanding feature of the new process is the way in which all waste is collected and utilised by several ingenious detail improvements and the avoidance of the costly liquid air plant for obtaining the nitrogen gas required in the ammonia synthesis. The nitrogen used is obtained entirely from the residual gas left in the process of oxidising the ammonia by the air. The process as a whole forms an apparently perfect closed chain process, in which the electric power supplied converts the raw materials, air and water into nitric acid or nitrates without any useless by-products. There are several other points of interest, such as introducing water into the compressed gases which are drawn from the residue, leaving the nitric acid absorption towers. This serves to remove any unoxidised ammonia in the residual gases in the form of a solution, which is then separated and concentrated by the waste heat from the synthesis chamber.

Points from Our News Pages

A special account is given of the newly established Fauser Synthetic Ammonia process in Italy (p. 28).

Reviews are published of a number of recent books (p. 30).

The Official Annual Review of the Alkali and Allied Industries in England and Scotland is given (p. 32).

A full report appears of the annual meeting of the British Dyestuffs Corporation (p. 36).

According to our London Market Report, there has been a quiet but steady demand for certain chemicals during the past week (p. 47).

Business in the heavy chemical market shows little improvement according to our Scottish Market report, and no change is to be expected until after the holidays next week (p. 50).

Books Received

Organic Chemistry. By Ira Remsen. London: Macmillan and Co., Ltd. Pp. 567. 10s.

A Treatise on Chemistry. Vol. II—The Metals. Bythe Right Hon. Sir H. E. Roscoe and C. Schorlemmer. London: Macmillan and Co., Ltd. Pp. 1,564. 50s

Wood Distillation. By L. F. Hawley. New York: The Chemical Catalog Co., Inc. Pp. 141. $3.00.

The Calendar

Sept. 10-13	Institute of Metals: Annual Meeting.	Manchester.
12-19	British Association for the Advancement of Science: Ninety-first Annual Meeting	Liverpool.

The Fauser Synthetic Ammonia Process

The process for obtaining synthetic ammonia by the method introduced by Fauser has been recently established in Italy, and has several original points of interest. The account below is abstracted from an article in "La Review des Produits Chimiques" of June 30.

THE plant in the Fauser process for the synthesis of ammonia consists of three sections respectively, for the production of hydrogen, the synthesis of the ammonia, and the oxidation of this to nitric acid to produce ammonium nitrate.

The production of hydrogen in Italy by electrolytic means is of great advantage because it allows of working without imported raw material. Electrolytic hydrogen is also preferable to that obtained by a process in which coke is used because of its great purity, which allows the use of much less complicated plant for its purification than that used in Germany, and also assures long life of the catalyst. Against this must be set the high cost of the electrolytic installation and the danger of explosion from the mixing of oxygen and hydrogen.

Apparatus for the Production of Hydrogen

In order to reduce this danger as much as possible, Fauser devised a double diaphragm in the cell as shown in Fig. 1 by leaving a space between the two sections (*c*). The gas evolved during the electrolysis collects in the two chambers (*d*) and (*e*), and leaves by the exit tubes (*f*) and (*g*). Such

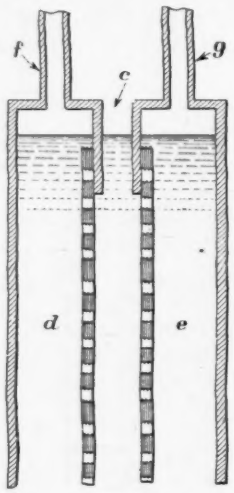

FIG. 1.

an arrangement prevents the mixture of the two gases because if one of the diaphragms becomes damaged, or if the level of the liquid accidentally comes below the lower end of the diaphragms, the escaping gas from one of the divisions does not penetrate into the other, but finds its way into the middle division, and from there escapes into the air. It is easy to see that such an arrangement gives a very much purer gas than is the case when ordinary diaphragms are used.

The electrodes are formed of a series of rings of iron arranged horizontally in such a fashion as to facilitate the escape of small bubbles of gas (Fig. 2). An external envelope of asbestos fibre prevents the gas diffusing outward. Lastly, to avoid an excessive concentration of gas without the necessity of reducing the depth of the electrodes, Fauser arranged in the electrolytic chambers themselves intermediate receiving bells for collecting the bubbles of gas and leading them direct to the main receiving bells (*l*). The latter are fixed to the electrodes without the interposition of an installating layer.

Details of the Electrolytic Cells

The exterior surfaces (*s*) of the collecting bells are covered with alkali-resisting insulating material in order to prevent their affecting the electrolysis.

As may be seen in Fig. 2 the internal partitions of the cell act as negative electrodes, and are also provided with intermediate receivers, and the collecting bells (*n*) are protected by an insulating cover. The gas which is evolved at the bottom of the cell is directed by means of a lining (*h*) behind the diaphragms between the vertical partitions. The hydrogen and oxygen leave the cell by the tubes (*i*) and (*g*), and collect in the purifying vessels (*T*), in which any electrolyte carried with them is separated and returned to the cell by the tube (*f*), while each gas is led away towards a storage vessel. The copper bars (*b*) and (*c*) welded to the top of the receiving bell lead the current into the electrolytic cell.

The electrolisers at the works at Novara have the following dimensions: Height, 2·25 metres; width, ·65 metres; length, 1·30 metres. The total weight of each unit is about 800 kilos. Each cell stands on six porcelain insulators on a cement base, and the installation consists of four batteries of 20 cells each.

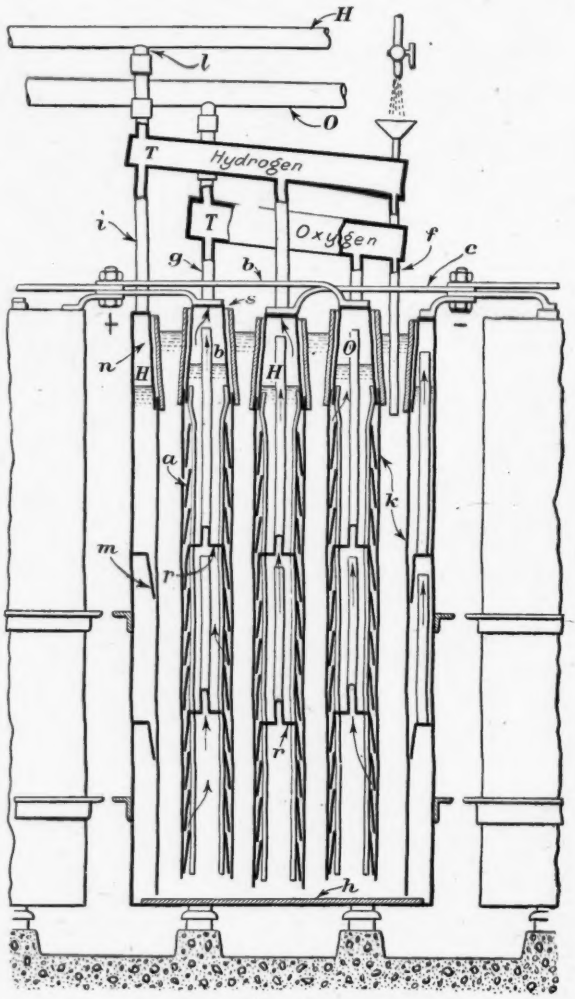

FIG. 2.

These batteries are independent of one another, so that the elements of one may be overhauled without interfering with the use of the others. The entire arrangement is fed by three six-phase alternators of 1,500 kilowatts, which transform the power from 150 volts A.C. to 210 volts D.C. The cells themselves use a current of 6,000 amps under a potential difference of 2·4 volts. This corresponds to a consumption of 6 kilowatt-hours per cubic metre of hydrogen produced. The voltage may readily be increased at any time, so that 8,000 amps are absorbed. When the installation is working at full capacity the output of hydrogen will be about 6,000 cubic metres daily. The degree of purity of the gas is over 99 per cent. A special apparatus automatically indicates the purity

of the gases produced, and stops the current immediately an explosive mixture is formed.

The Synthetic Ammonia Plant

The apparatus for the synthesis of the ammonia consists (Fig. 3) of—(1) a special pump for compressing both the gas and the water introduced for the reason to be explained later; (2) a column for synthesis containing the reaction chamber; (3) a column for the absorption and separation of the ammonia formed; (4) a pump for circulating the gases in the above-mentioned parts of the plant; and, lastly, (5) a device for distilling the ammoniacal solution by means of the waste heat from the reaction chambers.

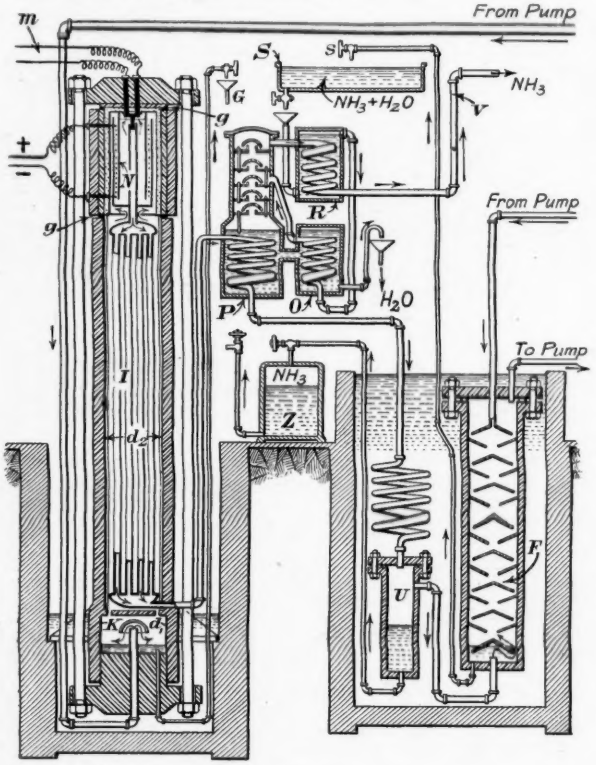

FIG. 3.

The installation is operated in the following manner: The compressor draws in through a side-tube a certain quantity of water, which acts both as a lubricant and as an absorbing agent for the ammonia at the instant it is produced. The mixture is further compressed and let into a column (*F*), where the water separates from the gas and falls into the lower part of the column, while the gases are passed on by a circulating pump (*E*), to the synthesising column. The latter is composed of three parts, a lower chamber (*K*) for condensing the water trapped by the gas, a central portion containing a heat exchanger, and at the top the reaction chamber.

The gaseous mixture in passing through the heat exchanger (*I*) passes over the exterior of the reaction chamber and absorbs heat from it, and also comes in contact with the electrically-heated spiral (*N*), which is used to bring it to the necessary temperature for the synthesis at the beginning of the operation. Afterwards the temperature is maintained by the heat of the reaction itself. A small thermocouple (*m*) allows the temperature of the synthesis to be controlled. After passing through the catalyser the gases, now partly combined as ammonia, go into the exchanger and leave at a temperature of 100° C. Their heat is further utilised in a fractionating column (*P*) for liberating the ammonia from the ammoniacal solution produced in the absorption column (*F*) in a way that will be seen later.

On leaving the spiral of the fractionating column (*P*) the compressed gases are then again cooled in giving up a large part of their ammonia in the liquid anhydrous form in another column (*U*). The ammoniacal liquor passes by an expansion valve into the chamber (*Z*) from which it is emptied into tubes or stored in a gasholder.

Finally, the gases are compressed and again charged with ammonia, and sent into the absorption column (*F*). As has been pointed out above, this column is used to separate the water which served as a lubricant. The water descends from the top to the bottom, meets the gases flowing from the bottom to the top, and absorbs all the ammonia contained in the column.

The gases which have not taken part in the reaction are pumped by the circulating pump (*E*) to the top of the column and re-enter the circuit for a second time. The ammoniacal solution flows back again to the base of the absorption column (*F*) and then up again by its own pressure into the tank (*S*), whence it passes into a vessel (*R*), where it is heated before passing again into the exchanger, where it is further heated by the waste heat from the ammonia solution. It then passes into the rectifying column. The escaping ammonia is condensed in a spiral immersed in the vessel (*R*), and is drawn off by the pipe (*V*).

Original Points in the Process

The original features of the Fauser process are as follows:—

1. The direct introduction of the water for the absorption of the ammonia by an induction pipe on the compressor, which lubricates the latter, is a considerable improvement, as the high pressure pumps used in other processes may be dispensed with.

2. The condensing column, common to all methods and used to separate the lubricant introduced by the compressors, is used in this case to separate and absorb the ammonia.

3. A scientific system of heat recovery from the gases leaving the reaction chamber gives a marked economy in the fuel required to separate the ammonia from the aqueous solutions.

Output of the Plant

The plant of the Società Electrochimica Novarese has a daily output of 18 metric quintals, and consists of two compressors (one being held in reserve), dealing with 250 cubic metres of gas hourly, and compressing them to 300 atmospheres. These pumps are worked by a 140 h.p. electric motor. The synthesising column is 8 metres high and has an internal diameter of 35 cms. A number of automatic devices are used to regulate the different stages of the process, reducing to a minimum the supervision required. As a result of these arrangements it is understood that the entire plant, including the hydrogen installation, only requires the use of four men.

Oxidation to Nitric Acid

In connection with the synthetic ammonia plant there is a plant for the oxidation to nitric acid. The method is that of Frank and Caro, which is largely used in Germany, the Società Electrochimica Novarese possessing the exclusive Italian rights for this process.

The oxidation plant consists of four burners, fitted with platinum gauze, of a diameter of 60 cms., and capable of oxidising 400 kilos of ammonia, which corresponds with a daily production of 10 tons of nitric acid of 36° Bé. The absorption of the oxides of nitrogen is carried out in four ferro-silicon acid towers and four iron alkali towers, 10 metres high and 1·5 metres in diameter.

Use of Residual Nitrogen

Fauser also introduced the idea of using the pure nitrogen, which remains in the residual gases after the oxidation of the ammonia, for the synthesis, so dispensing with the expensive and complicated apparatus for producing nitrogen from liquid air. The gases leaving the last absorption tower contain a high percentage of nitrogen (97-98 %) and small quantities of oxygen. The means of removing the latter is very simple, consisting in adding a calculated quantity of hydrogen and passing the gases over platinised asbestos. The oxygen reacts with the hydrogen, forming water vapour, leaving pure nitrogen. By increasing the proportion of hydrogen the right mixture (N_2+3H_2) for the synthesis is readily obtained. By this means also the whole of the traces of nitric oxide which have escaped absorption are recovered. If heating the catalyst is avoided, some ammonia is obtained in the form of a solution.

According to the calculations of Fauser, the consumption of energy for the fixation of a kilogram of nitrogen in the form of ammonia, in round figures, is 17 kilowatt-hours. Taking as a basis a conversion of 90%, about 19 kilowatt-hours are required to fix the nitrogen as nitric acid. This calculation refers to continuous currents such as are used in the electrolysis. If the figures for alternate currents are required, it is necessary to take into consideration the losses in transformation.

Summary

The Fauser method is intermediate between the Haber process and the Claude-Casale process, being more closely related to the Haber. The working pressure is slightly higher (300 atmospheres instead of 200), which appears to allow the liquefaction of the ammonia in the anhydrous state without difficulty. The uncondensed portion is absorbed in water under pressure, and afterwards obtained by means of an ingenious system of recovery and stored in a gasholder The lay-out of the plant also contains other interesting features making for economy, both in the operations with liquid ammonia and with the nitric acid.

Reviews

SYNTHETIC RESINS AND THEIR PLASTICS. By CARLTON ELLIS. New York: The Chemical Catalog Co. Inc. Pp. 514. $6.00.

The subject of this treatise is one of great and increasing importance. To the varnish maker the substitution of natural resins by synthetic products of definite composition and constant properties is a consummation devoutly to be wished for, since, quite apart from their variability, the limited supply, particularly of the fossil resins, is a serious matter for the future of industry. In other directions, too, the demand for plastic substances which when moulded can be treated so as to retain their shape and resist a reasonable amount of wear and tear is enormous and increasing. Although much work has been done in this field, the results are scattered and often only partially revealed in the patent literature and a few articles in the technical press.

Mr. Carlton Ellis has therefore earned the thanks of all chemists interested by collecting the data and presenting it in a systematic way which should not only be of assistance to those directly concerned, but induce other workers to examine more closely the tarry messes which are the despair of the organic chemist and are invariably thrown down the sink in disgust.

About a quarter of the book is taken up with a very full account of the resins of the phenol-aldehyde condensation and of the cumarone type which have now become established on the market. About half the remainder of the work is occupied with an account of various other reactions which yield more or less promising resinous products and of such quasi-synthetic products as the Ester gums.

The remainder of the book—about 100 pages—deals with the machinery and processes of moulding plastics and of the methods of testing and specifications for plastics for various purposes. The reader is therefore given a very clear idea of what is required of such products and the extent to which those already in use satisfy the users.

The book is lavishly provided with structural formulæ in the chemical section, and with illustrations of plant and specimens in the sections on moulding and testing. Neither author nor publisher has spared trouble and expense in giving a very full account of the present position and future possibilities of a branch of chemistry which has not only been ignored but actually avoided by the chemist in his desire to obtain compounds with definite chemical and physical constants.

Our rapidly increasing knowledge of colloids and the consequent familiarity with the physical properties of substances which are not amenable to the usual methods of the chemical laboratory should make the study of these synthetic substances peculiarly attractive to workers in the realms of physical and organic chemistry, and the present work will prove most valuable and inspiring to such, particularly if they have a leaning towards the study of industrial problems.

T. H. B.

FILTRATION. By CHARLES L. BRYDON and GEORGE D. DICKEY. Easton P. A. The Chemical Publishing Company. Pp. 375. $5.50

This book deals first with the principles of filtration, then with very many kinds of American plant, including dewaterers, expellers, centrifugals, presses, air, gas and light filters, etc., and finally gives some "operating data."

The main sources for the theoretical portion are apparently "Hatsch" (obviously Hatschek) and Sperry, whose well-known paper on rate of flow is reproduced in a slightly condensed form. A number of photomicrographs of various precipitates are given, but unfortunately the reproductions are rather small and the scale is not always stated. The method in which the layers of filtered product built up on the filter medium is considered fairly fully. The statement that "particles tend to place themselves so as to offer the minimim resistance to the flow of liquid" is not one which will commend itself to those with much practical experience of filtration, and should be subject to many reservations.

The subsequent sections of the book consist mainly of description of a very large variety of plant, and references are given to various sources of supply. It contains a great amount of matter of the type usually given out by manufacturers to prospective customers and although this has been amplified by the authors to some extent, it will still be mainly of service to those whose library of catalogues is incomplete.

There is a chapter on coagulants and filter aids. The one on filter media gives some tests of different types of filter surface and cloths. A fuller development of this would be valuable.

The chapter on operating data is distinctly disappointing. Little is to be found in the body of the book and much of that given here is devoid of its natural context and would be more valuable if it were stated from what catalogues it is taken. The most valuable portions are the little that is said about the effects of pressure, thickness of cake and type of cloth used.

Auxiliary equipment pumps, "thickeners," etc., are dealt with shortly in a final chapter.

There is an appendix of "useful information." This includes an interesting two-page table of materials and fittings used in pumping various liquids, but the remainder is very assorted and has been collected with too little caution. For instance, it is averred that "To find the number of gallons of water a pump will deliver per minute, square the diameter of the water cylinder and multiply by four!"

E. A. A.

THERMODYNAMICS AND THE FREE ENERGY OF CHEMICAL SUBSTANCES. By GILBERT NEWTON LEWIS and MERLE RANDALL. New York: McGraw-Hill Publishing Co., Ltd. 1923. Pp. 653.

The publication of this volume has been awaited in this country with considerable interest. The important work of Professor Lewis and his collaborators is well known here, but the special expressions he employs sometimes make it difficult for European readers to follow his papers, hence it will be very useful to have an account of the complete system of terminology in a form convenient for reference.

But this book is much more than an exposition of Lewis's own work, and embodies the most readable account of thermodynamical principles that has come to our notice. The preface is calculated to interest even the least mathematically minded of chemists in the subject, and the more sophisticated reader will enjoy the numerous vivid and illuminating discussions of the physical significance of the quantities with which the equations are concerned. The severity of the mathematical treatment is relieved by striking statements such as the following with reference to the calculated vapour pressure of tungsten at 25° C. "The result 10^{-140} atmospheres would mean that the concentration of tungsten vapour would be less than one molecule in a space equivalent to the known sidereal universe." We must refrain from quoting other examples, but will mention in passing a brief discussion on "What do we mean by Degree of Dissociation?" which throws light on some dark places in the theory of solutions of strong electrolytes. The physical chemist will be particularly interested in the discussion of solutions and the conception of thermodynamic activity, while the technical man will probably be astonished to learn from the concluding chapert

how far thermodynamics can go in predicting the extent to which a chemical will proceed under given conditions.

One important defect which should be remedied in a future edition is the lack of a set of answers to the numercial problems which are scattered through the book. The printing and binding leave nothing to be desired, and we have found very few misprints. One of these, however, deserves to be recorded. On page 294, Exercise 4, there is the following statement: "A large amount of meat is evolved when finely divided silica after thorough drying is brought into contact with water."

S. SUGDEN.

TECHNICAL METHODS OF ORE ANALYSIS FOR CHEMISTS AND COLLEGES. By ALBERT H. LOW. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. Pp. 348. 17s. 6d.

In preparing the ninth edition of his well-known text book, Professor Low has carried out a certain amount of revision and enlargement chiefly with the object of rendering the book better adapted to the requirements of students, but without impairing its value to the technical chemist.

The author, in his introduction, gives a very clear account of his own methods of instruction, including a specimen lecture corresponding to the laboratory work performed during a particular period. This is followed by descriptions of certain standard determinations, such as iron in ores by the permanganate method, the chromatic method for lead, etc. In each case the method is outlined in a series of short consecutive steps, this system, according to the author's experience, affording the most satisfactory means of instructing a class of students in the actual practical details of the determination which is being carried out.

The main body of the book is occupied by a collection of technical methods of ore analysis derived from various sources, and selected by the author as best adapted to the cases most likely to be encountered in practice.

The directions for performing a determination are particularly minute, and whenever necessary explanatory notes are added, the aim being to provide the operator with sufficient details to enable him to obtain satisfactory results without the necessity for recourse to other sources of information.

Apart from ore analysis, the book also contains instructions for the examination of boiler water, the testing of crude petroleum, and the preliminary testing of oil shales by distillation; in addition, some useful tables are included and the index is adequate.

This book may be recommended particularly to those technical chemists who desire all necessary practical details of a method of analysis accompanied by only such theoretical information as is essential to a clear understanding of the principles on which the method is based.

WM. CULLEN.

PRACTICAL CHEMISTRY. By E. J. HOLMYARD, B.A. London: G. Bell and Sons. Pp. 267. 4s.

This book is intended as a beginners' text book for use in schools, where classes of twenty or more students are dealt with at one time. The scope is fairly wide and it is divided into two parts. In the latter is included chapters dealing with simple organic preparations and experiments in physical chemistry, in addition to the usual inorganic elementary course. The matter is concisely presented with numerous clearly drawn figures in the text. The method followed is based on the author's experience as head of the science department at Clifton College. It may be noticed that a scheme of qualitative analysis is not included, as it is not considered a suitable form of instruction in school work.

LABORATORY MANUAL OF PHYSICAL CHEMISTRY. By Albert W. DAVISON and H. S. VAN KLOOSTER. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. Pp. 182. 10s. net.

This book contains a series of excellently clear instructions for carrying out experiments in physical chemistry suitable for the B.Sc. student. The subjects cover molecular weight determinations, solubilities, heats of solution, reaction velocities, electrical conductivities and so on. We cannot help thinking, however, that it would be better if the student doing this class of work had less detailed directions, at least for the majority of experiments.

THE PHASE RULE: AN INTRODUCTORY STUDY. By A. C. D. RIVETT, M.A., B.Sc. (Oxon), D.Sc. (Melb.) Oxford: At the Clarendon Press. Pp. 204. 10s. 6d. net.

The Phase Rule is held by its exponents to be one of the most fundamental principles of chemical equilibrium, yet it does not usually receive the attention it deserves, partly because of the difficulties in the use of the terms, partly because of certain inconsistencies, and partly because much of the experimental work is uninteresting. Mr. Rivett's book is to be welcomed, therefore, as giving a fresh presentation of the subject, starting from first principles. The subject is dealt with comprehensively and illustrated with numerous diagrams.

ABSORPTION OF NITROUS GASES. By H. W. WEBB, M.Sc., F.I.C. London: Edward Arnold and Co. Pp. 372. 25s. net.

This book deals with the problems arising in connection with the absorption of nitrous gases either in recovery plants or in synthetic nitrate plants, the importance of which is now being recognised in the interests of efficiency. The subject is dealt with from the scientific and industrial points of view and in addition a chapter is included on the analytical control of the process in various stages.

Remuneration of Public Analysts

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the remarks upon the remuneration of public analysts in the last issue of THE CHEMICAL AGE, there was no mention of the training required to qualify a person to hold the position. The only qualification for a public analyst seems to be the certificate of having passed the F.I.C. examination in the chemistry of food, drugs and water. To obtain this the Council of the Institute of Chemistry requires a candidate to have taken a four years' full time day course in an institution of university rank, and to have obtained at least a second-class honours degree in chemistry, or to have passed their own examination before becoming A.I.C. If the A.I.C. wishes to qualify in the food and drugs branch he must have had at least three years' experience in that branch before being admitted to the F.I.C. examination. To prevent precocious youth budding too quickly, he must be 24. It will thus be seen that a person cannot obtain the qualification which is accepted by the Ministry of Health under a minimum training of seven years. A person can qualify for admission to the medical register in six years. It is very doubtful whether it is at all understood popularly how long a period is required to fit a person to become a public analyst. By everyone the doctor's training is understood to be a lengthy one, but no one seems to think that the public analyst has had a longer.—Yours, etc. A. P.

Barnsley, July 7, 1923.

Sulphate Recovery

To the Editor of THE CHEMICAL AGE.

SIR,—We have noted the reference in the Leader of your issue of June 30 to the sulphate recovery from the Mond system, in which the modest figure of 60 lb. of sulphate per ton is quoted.

The amount recovered, of course, depends upon the nitrogen content of the fuel used, but we suggest that the figure you quote is exceptionally low. We have before us recent returns from a couple of plants, one gasifying Scottish coals, the other Midland coals. In the case of the former 70 lb. of 25·6 per cent. *neutral* sulphate is recovered per ton of fuel gasified, while the latter shows a return of 85 lb. of sulphate per ton of fuel gasified.

In our own low-temperature process the usual high yield of sulphate of ammonia is maintained, while at the same time a considerably increased recovery of tar—and this of the low-temperature type—is obtained, together with an increased calorific value of the gas.

It will be unnecessary to point out to you that these improvements, with the present-day ruling prices for tar and tar oils, very materially enhance the economics of the process.—Yours, etc.,

For the Power Gas Corporation, Ltd.,
Stockton-on-Tees, W. BESWICK,
July 11. Managing Director.

Annual Review of British Alkali Works

Trade Improvement and New Methods of Manufacture

The following extracts are taken from the Chief Inspector's annual reports on British alkali works for the year 1922. (*H.M. Stationery Office.* 1s. 6d.)

THE total number of works registered was 1,240, which entailed the inspection of 2,005 separate units (processes). Compared with the previous year this is a reduction of 43 in the number of works, and of 64 in the number of processes.

Although there has been a distinct improvement in some sections of the heavy chemical trade, what may be called normal conditions have not yet been re-established. The introduction of new methods of manufacture is, however, a hopeful sign for the future of the country, and it calls for increased vigilance on the part of the alkali inspectors.

This year again several works have been found, where operations, registrable under the Alkali, etc., Works Regulation Act, 1906, were being carried on without previous registration, viz.: 2 bisulphite works, 1 chemical manure work, 1 salt work and 2 tar distillation works. It seems strange that even yet it should be necessary to call attention of chemical manufacturers to the penalties prescribed for such contravention of the Act.

The total number of inspections made during the year was 3,837, in the course of which 2,457 quantitative estimations of the noxious constituents of chimney and other gases, escaping from the processes in operation, were made.

The visits mentioned above were those paid to registered works only: in addition to these a considerable number of visits were paid to unregistered works, concerning which complaints had been received from local authorities or from individuals. In practically all instances it was ascertained that the complaints were not due to emission of noxious or offensive vapours from registrable processes, but from operations concerning which the Alkali Inspector has no jurisdiction; nevertheless, much valuable assistance has been given to local authorities in a number of such cases, with a view to abatement of the nuisances undoubtedly existing.

Registered operations, on the whole, have been conducted satisfactorily: complaints of a serious character regarding registered works have been few, and in all cases prompt remedial measures were adopted. Two works in particular, however, have given considerable trouble, but a steady application of pressure has secured better working and greater attention to detail, with the result that much improvement has been effected in the atmospheric condition of the neighbourhood of the works in question. It is confidently anticipated that the improvement is of a permanent character.

Alkali and Copper (Wet Process) Works

A considerable amount of salt-cake continues to be made; large quantities are employed for the production of sodium sulphide, a manufacture which has extended considerably of late years; heavy consignments, too, have been used in the wood pulp industry.

It is a logical sequence of the disappearance of the older alkali process that the synthetic manufacture of hydrochloric acid from chlorine and hydrogen, obtained by electrolysis of brine, is showing signs of extending. During the past year, however, the acid position has been easy, owing to idleness in the fibre separation trade, which trade is usually responsible for a fairly large consumption of hydrochloric acid.

The employment of gas firing in connection with salt-cake furnaces has unfortunately shown no progress as yet.

The district inspector had occasion to complain of the conditions prevailing at one alkali work, where exits generally were so near the statutory limit that occasional excessive escapes became inevitable. The repacking of one of the towers proved to be necessary: moreover, it was considered necessary to ask for additional condensing plant, and this has been provided; the method of working the final scrubbers has been altered also. As a result a considerable improvement has been effected.

Apart from this instance of inefficiency, there has been little difficulty with works of this class, occasional temporary disorganisation only occurring at several works. Percentage condensation has been quite good and exits have been satisfactory.

Cement Works

The most serious nuisance that is likely to occur at these works is due to dust. Good depositing chambers are usually sufficient to obviate any serious trouble, but much more satisfactory is a system of filtration, such as is attained by passing the dust-laden gases through bags of suitable material. At one work, where dust trouble has been particularly acute, a good bag-house has effected the collection of many tons of dust weekly and at the same time an almost entire cessation of the nuisance.

Any reduction in fuel consumption is, of course, financially beneficial to the manufacturer, and at the same time it improves atmospheric conditions in the immediate surroundings of the works, and so improvements in vertical kilns with this end in view are welcome. It would appear that the introduction of a rotating grate has given encouraging results—whether the patentee's claim of a 50 per cent. reduction is substantiated remains to be seen.

Smelting Works

The deposition of dust from smelting-furnace gases continues to receive attention; cooling is a very efficient aid to the deposition of flue dust, and more use might be made of this—draught conditions do not necessarily form an insuperable barrier. In connection with the electrostatic removal of dust from furnace gases more attention is necessary to humidity than is usually given.

The highest acidities of chimney gases are usually obtained in the calcination of zinc blende, and the problem of dealing with these gases is receiving at our hands such attention that one may look for further improvement at no very distant date. Mechanical calciners are somewhat handicapped by the amount of lead contained in the concentrates so largely imported into this country: the essential difficulties are two-fold: (*a*) the production of a partially calcined product of a resistant nature, which gives trouble with the mechanical rabbles, causing breakage of parts, and (*b*) insufficient removal of sulphur unless a high-temperature final roast is included in the operation. Furthermore, if the calciner gases are employed in the manufacture of sulphuric acid, volatilised lead compounds are apt to cause considerable trouble in the Glover towers, where they collect and form obstructions.

Experiments are in progress, however, with a view to simplifying the method of procedure. It is hoped that we are on the way to superseding such methods of calcining blende as are not accompanied by conversion of the sulphur gases into sulphuric acid. Hitherto either the low sulphur dioxide content of the gases from many smelting operations, or the very variable composition of such gases, has precluded any idea of satisfactorily and economically converting the sulphur constituents into sulphuric acid. Experiments are now to be taken in hand with a view to testing the capabilities of recently proposed methods, which are said to be capable of successful operation under these conditions.

Reference to the averages table shows that the gases of smelting works chimneys have a much higher acidity than all others; and this becomes more marked as the activity of *b* lende calcination works increases.

Sulphuric Acid Works

The outstanding feature has been the rapid extension of the use of sulphur, from which now quite an appreciable proportion of the acid of the country is being produced. At several works rotary sulphur burners have been in successful operation. Replacement of pyrites by sulphur naturally further reduces the activity of wet-copper works, and moreover by producing a purer acid, it renders unnecessary the annoying and unpleasant operation of dearsenication.

Electrostatic deposition of dust from burner gas is receiving more attention, but one feels constrained to remark that each case should receive special consideration according to the nature of the material to be deposited—*e.g.*, volatility of constituents and conductivity affect the question of how deposition is best to be effected electrically.

Concerning lead chamber systems there is little that calls for remark. Leakage of sulphur dioxide at the point of entry of the burner pipe into the Glover tower is frequently a cause of annoyance to both inspectors and works managers : a water-jacketed collar, burnt on to the side of the tower has been used for some time at one works with great advantage.

Plant has been kept generally in good condition and exits, with one or two exceptions, have been very satisfactory.

Sulphuric Acid (Class II) Works

Concentration.

The average of tests made at all these works is satisfactorily low ; there has been a steady reduction each year since 1917.

One work has caused some anxiety during several months of the year, complaints of excessive emission of acid fumes being received on two occasions. At this work sulphuric acid is concentrated in glass bottles, and it transpired that on both occasions there had been breakage of several bottles, which were almost new. These bottles proved to be heavier, and consequently thicker, than those hitherto employed ; they were, therefore, less able to withstand such temperature variations as might occur at periods of stoking. A strong letter of warning was sent to the owner of the works, who promptly removed all the bottles of the type which had been responsible for the trouble ; since that was done, no similar occurrence has been reported.

The Calder-Fox scrubber has been further modified in detail, and the need for the introduction of a damper before the scrubber has been obviated. The results recorded during operation of this newer type have been very gratifying.

Contact processes.

Some improvement is to be chronicled in the working of Grillo plants, but more is needed. At the outset dust, and subsequently acid mist, are essentially to be guarded against, if conversion efficiency is to be maintained. In each case electrostatic deposition can play a very important part in attaining the end desired. Attention has been drawn to this in previous years, and it is gratifying to report that this year such means have been introduced at one work with apparently excellent results. At one installation exit gases are to be scrubbed with a solution of sodium carbonate, with resulting production of bisulphite. It should not, however, be necessary to have recourse to any such means of recovery simply for the purpose of bringing the acidity of the exit gases within reasonable limits.

Chemical Manure Works

The average acidity of gases from the condensers at these works has now for three years been under 0·1 grain per c. ft., reckoned at the SO_3 equivalent of hydrofluosilicic acid. It must be understood that this figure by itself is insufficient as an indication of the efficiency of any one plant : percentage removal of gases must be taken into account and this runs to a figure usually approaching 98 per cent. and frequently 99 per cent.

I would remind manufacturers of the remarks made in last year's Report (p. 7) concerning the designing of scrubbing plant. During the year just ended considerable trouble had been given by several newly-erected plants for which the scrubbing system had been quite badly designed.

Tower space must be ample and fan speed must not be excessive. In several instances during the past year it has been necessary to ask for a reduction of fan speed, and in each case, where such reduction has been effected, the result has been satisfactory in all respects. The introduction of excessive volumes of cold air into the system is neither necessary nor desirable.

Mr. Sutton, in his District Report, states that further experience of the use of high-pressure water sprays confirms the advantage of this method of scrubbing as compared with the old shower and drip method.

Sulphate of Ammonia and Gas-liquor Works

The outstanding feature at present is the general tendency towards the production of neutral sulphate. This is usually effected by neutralising the fished acid salt and then drying, but an interesting departure from this method is the " Bedford " process, in which a primary and a secondary saturator are employed, the liquor in the main (primary) saturator being taken to neutrality, so that the salt, as fished, is already neutral and requires drying only.

It is not edifying in these days of scientific control to reflec on the somewhat haphazard methods prevailing in so many sulphate of ammonia works ; by-products ought surely to be manufactured under as economical conditions as possible, compatible with quality of the article produced. The whole process of the treatment of ammoniacal liquor seems to be worthy of more attention at the hands of manufacturers than it receives ; but two points in particular are worthy of special consideration, firstly, on the ground of economy, and secondly, by reason of the present-day difficulty, so frequently experienced, of getting rid of spent liquors. I refer here to the quantities of lime and steam used in the still : the one is a case of the amount of alkali actually required to bring about the setting free of the " fixed " ammonia, the other is a question of the heat units required in the distillation process. It is a fact that these two items show very great variations and both are frequently in far greater excess than there is any need for.

Chlorine Works

The production of liquid chlorine has simplified the manufacture of chlorine compounds by doing away with the older and less convenient methods, which entailed the making of chlorine on the spot, and consequently users of chlorine are on the increase.

In every instance plants have been operated satisfactorily and precautions have been taken to prevent escape of chlorine into the atmosphere.

Muriatic Acid Works

The conditions existing at *tinplate flux works* in the previous year have been more than maintained this year, and chimney exits have been highly satisfactory. Work of an investigatory character has been commenced this year with a view to further improveing general conditions. Now that scruff treatment methods have so far advanced as to render the neighbourhood of tinplate works reasonably free from any annoyance due to noxious vapour, the point of attack has been shifted to an earlier stage of the tinplate operations, with a view to improving the pickling process and to ascertaining how far such may affect the character and quantity of the scruff : this, it is hoped, may lead to still further improvement of the atmospheric surroundings of the works. The laboratory work carried out thus far has given excellent results, so far as details of the pickling process are concerned, and Mr. H. J. Bailey's assiduity at the works themselves has had the effect of inducing the tinplate manufacturers to consider important points, which have been ignored in the past.

Sulphide Works

A number of complaints were received, alleging emission of sulphuretted hydrogen from new processes, which are not registrable under the Act. This gas is both unpleasant and noxious. There should be no serious difficulty in preventing its getting into the air from any process, that has so far come under notice. Sulphuretted hydrogen is easily removable by absorption, using such materials as hydrated oxide of iron or slaked lime. These may be used either in what may be termed a dry state or suspended in water, and, where considerable quantities of the gas have to be dealt with, it is quite possible to recover sulphur from the absorbent directly. The latter point is worthy of more consideration than is usually accorded to it.

No sulphide work, registered under the Alkali Act, has given rise to complaint this year, although inspectors have found it necessary to take exception to a lack of adequate supervision in regard to sulphuretted hydrogen escape from several works of other classes, viz. : sulphate of ammonia works and tar works.

Tar Works

The most recent innovation in tar distillation is the use of a molten metallic alloy for heat transference in the still : in each section of the plant the tar is fed in below the surface of a molten lead alloy, maintained at the desired temperature. Successful development of this variation from the usual plan of direct heating of the tar may have quite a number of advantages, including prevention of the separation of carbon.

Practically the only cause of complaint this year has been due to want of attention to pitch coolers at some works. Leaky pitch coolers are a distinct source of nuisance in the neighbourhood of the works, and it has been necessary in a number of instances to require either immediate repair or entire renewal of faulty pitch coolers. Fume pipes from

pitch coolers, too, are frequently neglected: there is no difficulty in providing and maintaining in good order a pipe from the top of the pitch cooler to ground level, which is lightly sealed in oil or even water. Other methods are in use, but that just mentioned is perfectly simple and quite efficacious. Neglect permitted in the matter of details in manufacturing operations leads inevitably to neglect regarding even more important points, and this in turn leads to general inefficiency both of plant and worker.

Where serious corrosion of the still is experienced, owing to the presence of tarry emulsions of an acid character, it is possible that considerable advantage may be obtained by the use of aluminium oleate, which may be prepared from oleic acid and such an aluminous material as alumino-ferric. This has been used at one work with considerable success.

I.—Average Amounts of Acid Gases Escaping.
Expressed as Grains per Cubic Foot.

	General Average.		
	1922.	1921.	1920.
1. *Muriatic Acid*—			
Condensed in alkali works.. per cent.	98·6	98·5	98·5
In gases of chimney or final outlet—			
(*a*) Alkali and copper (wet process) works	0·069	0·073	0·088
(*b*) Salt works	0·044	0·040	0·061
2. *Acidities of Chimney and Other Gases in terms of SO_2*—			
Escaping from sulphuric acid chambers	1·22	1·06	1·13
Final outlets from sulphuric acid concentration processes	0·65	0·68	0·71
Chimneys of smelting works	3·17	1·73	2·34
Chimneys of other works	0·70	0·66	0·73
All chimneys	1·00	0·75	0·95
3. *Condensers of Chemical Manure Works:* (SO_2 equivalent of H_2SiF_6)	0·08	0·06	0·09

II.—Amount of Ammonia Products Manufactured in England and Wales, 1922.
Expressed as Sulphate (25¾ per cent. NH_3)—Tons.

From Liquor produced in—	1922.	1921.	1920.
Gasworks	144,817	129,431	143,979
Iron works	83	167	718
Shale works	—	—	—
Coke oven works	125,679	54,184	143,391
Producer-gas and carbonising works (bone and coal)	4,722	4,446	10,005
Total	275,301	188,228	298,093

III.—Amount of Tar Products Manufactured in England and Wales, 1922.

	Gas and Coke Oven Works. Tons.	Other Works. Tons.
Tar distilled	1,176,610	9,384
Pitch produced	448,595	4,288

Alkali Works in Scotland

In the report of the Alkali Inspector (Mr. J. W. Young) to the Scottish Board of Health for 1922, it is stated that the number of works registered in Scotland was 165, in which were operated 315 scheduled processes as follows:—6 alkali (saltcake), 1 alkali (wet copper), 1 cement, 2 smelting, 20 sulphuric acid, 16 sulphuric acid (Class II), 27 chemical manure, 14 gas liquor, 7 nitric acid, 111 sulphate and muriate of ammonia, 2 chlorine, 3 muriatic acid, 14 sulphide, 1 alkali waste, 11 lead deposit, 1 arsenic, 6 nitrate and chloride of iron, 1 carbon bisulphide, 5 paraffin oil, 7 bisulphite, 58 tar, and 1 zinc extraction.

The number of visits made to works was 511, and there were 295 chemical tests, in one of which acidity was measured exceeding the limit prescribed by the Act.

Generally operations continued to be restricted, but during later months in some branches there was increased activity.

No legal proceedings were taken under the Act. Four cases of complaint against works were investigated: one was baseless; upon two comment is suspended as claims at law are involved; news of the fourth was delayed in reaching the Inspector. Vegetation in neighbourhood of a sulphuric acid works was injured severely. There were novel features in the construction of chemical plant, raw material differed from previous supplies, and the management lacked experience to overcome these difficulties. As a result acid gas, which should have been manufactured into sulphuric acid, escaped at times freely into the atmosphere. In the course of ordinary visiting nothing was seen or heard of these outbursts. Inspectors can best perform their duties when incidents occurring between their visits are communicated to them and their advice if necessary, sought. Several changes have been made, so that there is reason to expect lasting improvement.

By the courtesy of manufacturers the usual summary of raw materials and of products is given below.

		1922 Tons	1921 Tons
Pyrites and spent oxide burned		97,919	71,416
Phosphates and bones dissolved		69,301	51,796
Salts of ammonia (expressed as pure sulphate)—			
From gasworks	19,046		
From ironworks	2,996		
From shale works	45,860		
From coke, producer gas and carbonising works	7,939		
		75,841	62,343
Tar distilled—			
At gasworks and coke ovens	138,385		
At other works	34,786		
		173,171	148,608
Pitch produced—			
At gasworks and coke ovens	41,978		
At other works	19,375		
		61,353	58,833

Alkali Works

No salt was converted into alkali, and less than usual into saltcake; although demand for the latter from abroad improved. Conditions were good throughout at the works, and also at deposits of alkali waste.

An old landmark, the great chimney of St. Rollox, has gone: through distrust of its stability, demolition was in progress, but the shortened stem collapsed spontaneously, causing the loss of four lives.

The general average amount of muriatic acid discharged into the air was in each cubic foot of chimney gases, 0·055 grain, the highest and lowest averages for any one work being 0·164 and 0·02 respectively. In no test was measured an amount of acid exceeding the Act limit of 0·2 grain.

Sulphuric Acid, and Sulphuric Acid Works

Spent oxide has been burned in greater quantity: inadequate retention of dust has caused frequent trouble. Unavoidable diminution of chimney draught caused a short period of disorganisation at one works, so that the test of the exit gases from the plant showed a slight excess over the statutory limit of 4 grains of acidity.

A variation from the usual method of scrubbing residual gases of the lead chamber process has been on trial. Later it is hoped to present a full account.

Processes comprised in Class II. have been rather busier than in 1921 and without incident.

The general average acidity in each cubic foot of residual gases discharged was 0·59 grain of sulphuric anhydride; the highest and lowest from any one work were 2·29 and 0·22 respectively.

Chemical Manure Works

Good results of an improved system of condensation of the corrosive gases emanating from this process were mentioned in last year's report and have continued. These are so destructive to the steel and ironwork of the modern type of den that repair or even renewal is needed in a few years. Some time ago it was suggested at one such works that the old-fashioned paint of slaked lime mixed with skim milk would surpass any oil paint in durability of coating and protective action towards the metal it covered. The manager has now stated that his trial was entirely satisfactory, and his experience may be useful elsewhere.

At another works, lately installing new plant, an irritating back rush of gas was noticed from the charging hole, although all was apparently in good order. The explanation was simple; the makers' designs were at fault. So long as mineral containing little carbonate was used, dissolving was easy; but with change to another material, richer in carbonate, reaction in the mixer was so vigorous that the charge overflowing into the flue choked the passage of gas to the washtower.

The general average of the total acidity in each cubic foot of gases escaping finally was 0·09, expressed as the SO_3 equivalent of silicofluoric acid; the percentage condensation varied from 94 to 100.

Sulphate and Muriate of Ammonia Works

At some works it was thought advantageous to run gas liquor to waste rather than to recover the contained ammonia.

A few instances of leaking joints were observed in saturators; but they were quickly repaired, on the advice of the Inspector.

Drying of neutralised salt tends to be over elaborated and at too high a temperature, so that afterwards it is necessary to crush down or grind the lumps. None is so effective as the simpler plants, wherein an ample and steady current of warm air is led through the agitated salt.

It is seldom necessary now to comment on oxide purifiers as kept too long in use.

At the coke ovens of the Plean Colliery Co., near Stirling, fluorine is found in the gas liquor as a regular constituent. By reason of its corrosive properties on metal it is thought advantageous to remove it before recovering the dissolved ammonia. The Inspector is not aware that such presence of fluorine has been previously observed.

Manchester College of Technology

Coming-of-Age Celebrations

THE celebration of the coming-of-age of the Manchester College of Technology took place on Thursday, July 5. The guests were received by The Lord Mayor of Manchester (Councillor W. Cundiff) and Viscount Burnham.

Although a portion of the College of Technology has been in actual use since September, 1901, the building had not then been formally opened. The then Prime Minister, Mr. A. J. Balfour (now Earl Balfour) performed the opening ceremony on October 15, 1902. The late Alderman Thomas Hoy, to whose zeal and strenuous efforts the establishment of the College was largely due, presided. Mr. J. H. Reynolds was the first principal, to which office he was appointed after nearly a quarter of a century of service at the old Manchester Mechanics' Institute, the real forerunner of the College. Under his supervision the usefulness and scope of the College rapidly extended, until practically all forms of industrial or scientific study or research can be provided for. Many important exhibitions have been held in the building, and the North of England Educational Conference held its first meeting there. Mr. Reynolds resigned in 1912 and was succeeded by Mr. J. C. Maxwell Garnett, C.B.E., M.A. (Camb.) The present principal is Mr. B. Mouatt Jones, M.A. (Oxon).

Work of the College

The College is now quite the equal of the great Continental educational establishments, and at one particular period there were nearly 30 different nationalities represented among its students. It provides a university training and is actually a part of the University of Manchester. The three years' undergraduate course leads students who enter through the matriculation examination to the degree of Bachelor of Technical Science. Further, those who take the highest honours in their finals may remain for an extra year for the purpose of gaining the higher degree of Master of Technical Science. In regard to industrial research, the College is largely assisted by the co-operation of firms engaged in the Lancashire industries, and the results generally are beneficially reflected throughout the trade of the whole country. Parliament, realising the value of the work done, has made increasingly large grants in aid. The College itself has provided a number of research scholarships, and established a new department for post-graduate study and research bearing upon the manufacture of intermediate products and finished dyestuffs from coal tar. There are also part-time classes for those whose employment occupies the greater part of their time.

The approximate annual cost of maintaining the College is £50,000. The municipality contributes about £20,000, there are Government grants of £15,000, the receipts from students average £12,000, and about £3,000 is received in the form of grants from neighbouring local authorities. The work of the College is controlled by the City Council through its Education Committee and the College of Technology Sub-Committee, with the assistance and advice of the Board of Studies. Apart from administration and finance, the work of the Faculty of Technology, as of other Faculties, is controlled by the Senate of the University through the Board of the Faculty. The buildings and most of the equipment of the College belong to the City of Manchester.

Special features in the evening's programme included ten forms of spark and valve transmission from the College Wireless Station (5DQ), a wireless concert, and an exhibition of historical and modern valves in the wireless laboratory, together with types of the most modern apparatus; demonstrations of dyeing and papermaking, exhibits showing the synthesis of saccharine from coal tar to the finished product; the results obtained by research workers during the past few years in various branches of applied chemistry. Exhibits of various types of apparatus used for the testing of oils and fats, and of foodstuffs, etc., were shown, whilst a comprehensive collection of perfumes, both synthetic and natural, attracted much attention.

Lord Burnham's Address

Lord Burnham, in his address to the guests (which was broadcast to an overflow meeting), said that it was the proud boast of the Manchester Corporation that alone, he believed, among the local authorities of the country, it maintained what was a recognised branch of the University as a municipal institution. He was glad to think that that meant an intermingling of civic and intellectual life which must be equally to the benefit of the College and of the community. The College did well to look to all that was developing in the educational systems of the world. For the last two years he had been much engaged in international questions, touching trade and industry, as president of the International Labour Conference, and he found that the intense and ardent desire to make the best of all the educational values that we had was not confined to this country nor to the English-speaking countries, but was common to the whole of the civilised world. In nearly every country intense interest was felt in two new lines of educational activity—vocational guidance and vocational selection. Experience had shown that quite a number of young people of both sexes were obliged after a time to change their trades, because they had not the ability to follow them successfully. Such changes were as injurious to the employers in an industry as to the workers themselves. Vocational guidance, he believed, was going to be a great and urgent problem in our national education in the next few years. The elimination of the misfit in industry and in the application of science was a matter of vital importance. We should do our utmost to ensure that there should be as little waste of national ability and national adaptability in our industries as possible. That aim could only be achieved by recognising that not only the State but the local authorities throughout the country had a great duty to perform in guiding young men and women into the callings which best suited their abilities and their capacity.

Sir Alfred Yarrow's Gift for Research

THE Council of the Royal Society have of late been giving their attention to the best way of using Sir Alfred Yarrow's gift of £100,000 for the endowment of research, which was announced in February of the present year. On reviewing the situation, it appeared to the Council of the Royal Society that there was a marked deficiency of positions in which a man who had already proved his capacity could continue to regard research as the main occupation of his life. Consequently, at the council meeting of July 5, it was finally decided to use the larger part of the income in the direct endowment of research by men who have already proved that they possess ability of the highest type for independent research. To this end a number of professorships will be founded, of a type similar to the Foulerton Professorships, which were founded by the society in 1922 for research in medicine. The professors will be expected to devote their whole time to scientific research, except that they may give a limited course of instruction in the subjects of their research to advanced students. There is at present a tendency to regard scientific research as a secondary occupation for men whose primary occupation is the teaching of students. The intention of the Royal Society in founding these professorships is to recognise research as a definite profession.

Company Meeting.

British Dyestuffs: The Year's Trading and Results

Cost of Dyes—Dangers of a Rigid Price Basis—Industry Finding its Feet

THE fourth ordinary general meeting of the shareholders of the British Dyestuffs' Corporation, Ltd., was held at the Milton Hall, Deansgate, Manchester, yesterday (Tuesday, July 10). Sir William Alexander, K.B.E., chairman and managing director, presided over a large attendance of the shareholders. Mr. D. R. Mackay (secretary) read the notice convening the meeting and the report of the auditors.

The Chairman, after furnishing a comparison between the balance-sheet before the meeting and that of the previous year, proceeded: We will now turn to the year's results as shown on the first page of the directors' report. The balance of profit (after providing a total of £411,000 for depreciation and crediting the further amount estimated to be recovered in respect of excess profits duty) amounts to £102,656. The balance of loss carried forward from the previous period was £803,355. This leaves to be carried forward to next year a deficit of £700,699. The volume of trade in the home market has shown a substantial increase, which your directors have endeavoured to stimulate by reducing prices—in many instances even below the present level of cost. The possibility of trade with overseas markets has been very limited and business has been carried on under great difficulties. Although we are preserving a position in the more important foreign markets, it is more with a view to development in the future than to the realisation of any immediate benefit. So long as colours from German sources can be offered in neutral markets at prices against which no country with a stabilised currency can compete I am afraid this unsatisfactory condition of our overseas trade must continue.

Our trading results for the year ended October 31, 1921, were affected by two items of an exceptional nature—namely, the large amount required to be written off stocks to reduce them to current market prices, and a substantial amount estimated to be recovered on excess profits duty. The further amounts brought into the current year's accounts in respect of these two items are comparatively small, and if we take the two trading periods and ignore in both cases the amounts credited for refund of excess profits duty and the amounts written off stock values, we find that the trading results for the year ended October 31, 1922, show an improvement of £778,000 as compared with the previous year. I think you will agree that this result, which has been obtained notwithstanding an average reduction of 17½ per cent. in our selling prices, constitutes the best justification for the policy adopted by your Board and reported to you at the last ordinary general meeting. I propose briefly to recapitulate the manner in which we have endeavoured to deal with the problems we were then called upon to face.

The Year's Achievement

I shall first refer to the excessive stocks of raw materials, stores, and colours accumulated in previous periods. With the exception of certain stocks of engineering stores, made to meet the special requirements of our business and which we are utilising from time to time as opportunity arises, all these surplus stocks have been liquidated. This step, by releasing a large amount of capital previously tied up has contributed to the strengthening of our financial position, with the result that we have to-day a total of over £2,000,000 in cash or invested in readily realisable securities.

For some time past all items of expenditure have been periodically reviewed with the object of securing reductions and bringing our standing charges into closer relation with the present restricted volume of trade. It is satisfactory to report that the economies effected have contributed in no small degree to the improved trading results which are now before you.

In research and technical development we have continued the policy of concentrating our efforts mainly on raising the standard and quality of our production and improving our processes of manufacture, through which our trading operations have materially benefited. This improvement arises not only from the application to works processes of the results obtained in our research laboratories, but also from the more intimate knowledge of plant operations which our process chemists are acquiring. I am convinced that it is to this cause we must look more and more in the future to secure economical working and improved efficiencies. A loyal and contented staff, working together with a common aim, is essential to our plans, and during the year we have consolidated our technical staffs and given the new organisation a fair chance of establishing itself. Any further changes will be made only after careful consideration, and solely with a view of developing still further the policy of consolidation which your directors are convinced is vital to success.

Trading Prospects

In my speech of last year I pointed out that the main hope of obtaining a reasonable return on our capital must lie in our ability to keep our plants well employed. I am afraid that I must repeat this warning. The present volume of trade is still too restricted to allow our plants to be used as economically as is possible, and until normal conditions of trade are restored in the consuming industries no marked improvement in our trading results can be anticipated. In the meantime, your directors are continuing to conserve the financial resources of the undertaking and to effect such further economies as are possible in both productive and administrative charges.

To one item of expenditure I desire to make special reference. During the four years ended October 31, 1922, your Corporation and its associated companies have spent a total amount of over £400,000 on research. Much of this expenditure has been incurred in establishing the constitution of colours not previously made in this country, and in working out processes for the manufacture of the new and necessary intermediate products. This field has now been well covered, and expenditure in this direction is diminishing. Henceforth our principal aim will be to utilise our research organisation for the purpose of securing better efficiencies and increased yields of products in actual manufacture and of introducing such new colours as are in steady demand by the consuming trades. It is with this object that the consolidation of our technical staffs has been carried out, and your directors feel that the time has come when further economies can be effected in our research department. We are fully alive to the necessity of research, not only for the improvement of current operations, but for the working out of new problems which, although not immediately remunerative, will, it is hoped, enable us, as time goes on, to take a more independent line in the development of dyestuffs and allied organic products. I promise you that this aspect of research work will not be neglected in any steps which are taken to effect economies.

Effect of the Ruhr Occupation

A word now on reparation dyes and the effect of the Ruhr occupation. In September, 1922, the Corporation was appointed agents for the Board of Trade for the distribution of dyestuffs received under the reparation clauses of the Treaty of Versailles. The organisation established for importing, warehousing, and distributing such dyestuffs is working efficiently, and we have every reason to state that it has given satisfaction to consumers and others interested. Considerable and changing difficulties have been experienced in maintaining contact with German suppliers since the occupation of the Ruhr valley by France early this year. So far, however, we have succeeded in obtaining the great bulk of the supplies awaiting delivery, and have every hope that the balance still available for us will be received. Very considerable disturbance to the German dyestuff industry has been caused by the French occupation. Whilst some works have been able to maintain output, others are entirely closed, and it is estimated that German production has already been reduced by over 50 per cent. Difficulties are increasing, and it is impossible to forecast what the end may be. The position

has become more confused by the action of France and Belgium in seizing large stocks of dyestuffs, which have been conveyed to French and Belgian territory. An indiscriminate distribution of these dyestuffs might materially affect the interests of your Corporation, and strong representations, which are not being disregarded, have been made to the Government on the difficulties and dangers of the situation.

The Prices of Dyestuffs

I now turn to a matter to which prominence has recently been given by consumers and others—namely, the prices charged for our dyestuffs. At our last meeting I stated that our average price was then 3s. 5d. per pound. The average price to-day is 2s. 6d. per pound—a reduction of 25 per cent. Your directors consider that the demands of the consumer for price reductions have been met to the utmost of the resources of the Company. The consumers, through their organisation, the Colour Users' Association, have expressed disappointment that we cannot go further, and they have suggested that we should take a bolder line and reduce prices to a level of not more than three times the pre-war price as a maximum on each individual colour, relying upon the Government to make good any loss by a grant-in-aid from the proceeds of the sale of reparation dyes or by a direct subsidy. Discussions have been proceeding for some time past with the Council of the Colour Users' Association, but, unfortunately, we have not been able to see eye to eye with them.

I believe I am correctly stating the attitude of the large majority of consumers when I say that they are as determined as ever to have a dyemaking industry in this country as security against such a position as now exists owing to the disorganised state of Germany. Where we part company is in the contention they put forward that a three times pre-war factor as a maximum is sufficient not only to cover the economic advance in the cost of production, but also to yield a handsome contribution towards the development and establishment of the industry.

The Three Parties to the Industry

I think we are all agreed that no industry of the complexity of ours can be established without some sacrifice on the part of those most vitally interested in it. In our case there are three parties with a common interest: the Government, the user, and the shareholder. The industry is of interest to the Government in that it provides the only school in which a large and competent body of chemists can be trained in the technology of organic substances. The industry is of interest to the user because it is the only security he has against a repetition of the position in which he found himself in 1914. The industry is of interest to the shareholder because he has a large financial stake in it. It is only by maintaining the common interest of the three parties, the Government, the user, and the shareholder, that any progress can be made, and it is imperative that there should be equal readiness to contribute towards that progress.

So far the contributions of the Government have been, first, the subscription of 1,700,000 preference and preferred ordinary shares in the Company, and, second, the passing of the Dyestuffs (Import Regulation) Act prohibiting for a term of years the importation of dyestuffs except under licence. It is important to remember that this Act was passed to put into effect the declared policy of each successive Government since 1914, which policy took concrete form when in May, 1918, the President of the Board of Trade announced in the House of Commons that protection would be afforded to the dyestuffs industry by means of a control of imports.

The contribution of the consumer of dyestuffs has been assent to a restriction of access to foreign sources of supply through the operation of the Act. This assent was given subject to the right to demand a licence for importation in cases where the prices quoted by the home manufacturer placed the consumer in an unduly disadvantageous competitive position.

The Shareholders' Contribution

The contribution which the shareholder in this Corporation is making towards the establishment of the industry is one which is apt to be entirely overlooked. Those who subscribed £5,000,000 of new capital are entitled to expect, under normal conditions of trade, an adequate return on the capital so invested. Let us examine the return which the shareholder has actually obtained from 1914 onwards. The Corporation and its predecessors rendered an invaluable service to the colour-using industries in this country—a service which enabled these industries not only to maintain their position in the world's trade, but to make profits which were certainly not less than those made in pre-war periods. From 1914 to date, the shareholders of British Dyes, Limited, of Levinstein, Limited, and of British Dyestuffs Corporation, Limited, have in all received by way of dividend a total sum equivalent to 2 per cent. per annum on the average share capital employed, and are now faced with a trading loss amounting to more that £700,000 (a sum slightly in excess of the total dividends previously paid) and also with the necessity of continuing to set aside for some time to come large sums for depreciation, research, and development. During the same period an expenditure of more than £7,000,000 has been incurred in the provision of land, buildings, plant and machinery for development purposes.

It is true that the bulk of this expenditure took place during a period of exceptionally high costs, but I ask you to remember that this expenditure would not have been entered into had it not been considered by all parties concerned that the need was urgent and that heavy expenditure, at whatever cost, must be immediately faced if a dyestuffs industry was to be established in this country. By way of provision for this abnormal cost of construction and for the heavy depreciation inseparable from chemical plants a total sum of £3,500,000 has been set aside to date. Much of this sum might have been legitimately distributed in past years by way of dividend. The sounder view of working for the ultimate establishment of the business on the basis of a moderate capitalisation has been taken, and I think, with these figures before you, you will agree, both as shareholders, and many of you as users, that the shareholders have more than done their part in assisting to establish the industry.

The Suggested Maximum Price for Dyes

I will now return to the proposals of the Colour Users' Association to establish a three-time pre-war factor as a maximum price at which dyestuffs should be sold. It is not easy to ascertain the pre-war price of dyestuffs, owing to the practice adopted by the German firms of granting price concessions to large consumers, but we have prepared a statement showing what we consider to be the average pre-war price of each of the colours now sold by us. This statement has been furnished to the Council of the Colour Users' Association, and, although they may not accept every one of the prices we have adopted, I think they will agree that we have endeavoured to be as impartial and as fair as possible. Working on the basis of this statement, we estimate that the application to our present rates of a three-time factor as a maximum would adversely affect our trading results to the extent of something between £300,000 and £350,000. The effect of the application of this factor to future trading results is best realised when I tell you that by its adoption the Corporation could double its turnover and still show no profits available for distribution amongst its shareholders. That, ladies and gentlemen, is a situation which we, as directors, cannot recommend our shareholders to accept.

It may be replied that this result arises because we are either inefficient in our production or extravagant in our management. This I deny. Since our last meeting we have placed on the market, in addition to 21 improved brands, no fewer than 45 new colours equal to the best German type. We have no reason to feel ashamed of the progress we have made in securing increased efficiencies, but you cannot, in such a highly complicated industry as ours, build up a technically perfect organisation within a few years. On the administrative side we have rigidly curtailed expenditure, and any further economies that may still be effected (and there will be no relaxation of our efforts towards this end) would make a relatively small contribution towards the reduction of our costs.

Manufacturing Costs: A Comparison

I do not think that the magnitude of the increase in costs of manufacture in the dyestuff industry to-day, as compared with pre-war costs, is fully realised. The chairman of the Colour Users' Association has kindly furnished me with a copy of the speech recently delivered by him to the Council of that Association. In that speech he gives the present wholesale price index figure at 61·4 per cent. above pre-war rates, and deduces from this that the colour user is not unreasonable in asking that the British manufacturers' prices should not in any instance exceed 200 per cent. above pre-war prices. The wholesale price index figure does not, unfortunately, assist us in considering the advance in our manufacturing costs. I have had prepared a comparison between pre-war and present prices for the principal items entering into our costs, and these I will give. Raw materials, based on a weighted average of the 25 principal raw materials used, show an advance of 133 per cent. over pre-war costs. Salaries of our chemical, technical and engineering staffs show an advance of 174 per cent. Wages show an advance of 142 per cent. Coal, services, stores, and general charges show an advance of 130 per cent., making an average advance of 135 per cent., which is more than double the wholesale price index figure quoted by the chairman of the Colour Users' Association. A factor of 2·35 times pre-war is, therefore, required to cover these increases.

There is a further point involving an increase in the cost of manufacturing dyestuffs throughout the world which cannot be ignored. Before the war the German dyemaking firms controlled directly or indirectly over 90 per cent. of the world's production of dyestuffs, and, having the whole world as their market, they were able to keep their plants in continuous operation. Since the war dyestuffs plants have multiplied, particularly in France, the United States, and this country, and no group of dye manufacturers in any country can in future expect to obtain such a predominant share of the world's trade as was enjoyed by the German firms in the past. Standing expenses in the dyestuffs industry are heavy, and in comparing pre-war with present costs some allowance must be made in all dye-producing factories for the fact that plants cannot be worked as intensively as in pre-war days, and costs must be fixed on a production materially below available capacity. I estimate that even in a period of normal trade an increased factor of at least ·35 is necessary for this purpose, and adding that to the price factor of 2·35 previously given we obtain a factor of 2·7 times the pre-war price which is required to cover the increased cost in present manufacturing conditions as compared with those prevailing before the war.

Objections to a Rigid Price

The factor offered by the Colour Users' Association is a three-time maximum factor with no minimum. A number of our cheaper colours are at present sold below this price factor, and if we take our actual sales and apply to them the three-time factor or the present selling price, whichever is lower, we obtain an average factor of 2·75. Therefore, by offering us a three-time factor a a maximum the Colour Users are only offering a factor sufficient to cover the difference between economic conditions of cost to-day and those prevailing before the war. They are giving us nothing towards the establishment and building up of the industry.

Many colours can be, and are being, sold within the factor suggested by the Colour Users' Association. Many other colours will, with a return to normal working, automatically come within this factor limit, but there are many colours which, owing to heavy expenditure on research, works trials, and the lack of technical experience, we are unable to produce at a price calculated on this basis. To sell them on these terms would mean a heavy financial loss to the Corporation and an unreasonable sacrifice on the part of our shareholders.

The high degree of technical skill attained by the Germans was only reached through many years of research and continuous operations of very large plants. Our experience in this sense only began after the war, and we have, unfortunately, owing to the depression in trade, not been in a position to work our plants in such a continuous manner as to enable our chemists to acquire the detailed knowledge and the technique of the small adjustments in methods of operation which often mean the difference between success or failure to produce at a low cost. Further, it must be remembered that in 1914 keen competition existed between the two groups which now constitute the German Interessen Gemeinschaft, and this led to the prices of ordinary ranges of standard colours being cut to a level which yielded little or no profit. For the bulk of their profits the German firms relied upon specialities, some of them new colours and some of them products outside the dyestuffs industry proper, such as the heavy chemical production of the Badische Company, the serums and fine drugs of Meister Lucius and Brüning, and the photographic products of the Bayer Company.

These undertakings, secure in their main purpose, have had time and energy to spare for new fields of manufacture. The strength of *our* technical and research staffs has of necessity been given to the production of the colours immediately needed by consumers. *We* must first be satisfied as to the range and quality of our colours, and as to the efficiency of our processes, on which our very existence depends. Developments on new lines, for which we have both the ideas and the ability, will follow.

The Licensing Committee

I must here refer to the Licensing Committee appointed under the terms of the Dyestuffs (Import Regulation) Act. This Committee consists of five nominees of the user, three nominees of the maker, and three independent members. You will see, therefore, that the makers, in order to secure a majority on any question affecting their interests, must have the support of all the independent members.

The Licensing Committee is the battle-ground of the user who desires to import a colour and the maker who objects to its importation on the ground that the equivalent is already manufactured by him. Both makers and users are assisted by a technical staff, and the bulk of applications put forward are readily dealt with by agreement between the various interests.

In September last, as a temporary measure, the Licensing Committee agreed to grant applications to import where the British prices were more than three times the pre-war level or were higher than the current foreign prices. In other words, the British maker was given the opportunity to take the business, either at the foreign price quoted or at three times the pre-war price, whichever was higher. The nominees of the makers agreed to this temporary arrangement on the understanding that financial assistance, in some form or other, would be forthcoming from the Government. This expectation has not been fulfilled, and the makers are in many instances faced with the alternative either of selling their products at a loss or refusing orders and ceasing to manufacture. Under these circumstances we have advised our nominee on the Committee to withdraw our assent to the arrangement made, and to request that all applications be dealt with strictly in accordance with the procedure laid down under which the user must prove that the price quoted by the British maker places him in an unduly disadvantageous competitive position.

New Colours: Effect on German Prices

Your directors regret exceedingly that they have been compelled to take this step, but when I give you a few examples of the manner in which the present arrangement has operated I think you will agree that, failing the compensation which has not up to now been forthcoming, we were unable to take any other action. In May, 1920, we introduced on the market an important acid colour at 25s. per pound in competition with the German type then selling at the same price. In March, 1921, we introduced an improved brand, slightly superior to the German type, and were able to reduce the price to 13s. 6d. a pound. We are to-day prepared to accept bulk orders for this colour at 8s. a pound, although at this figure we are barely covering actual works cost. Licences for the importation of the equivalent foreign colours are being applied for to-day at prices varying from 4s. 8d. to 6s. 6d. a pound. We have consequently been compelled to close down our plant and cease manufacture.

In March, 1922, we introduced a vat colour, of which we are the only manufacturers in this country, in competition against the German product which was then selling in powder form at 68s. per pound. Our colour, which is equal in strength and properties to the German type, but admitted by consumers to be rather superior in shade, was introduced at 45s. per pound. The effect of our entering the market has been to reduce the German product to 34s. a pound. In 1919 we intro-

duced, in response to a general demand by users, a direct cotton colour at 12s. 3d. per pound. We have offered to take contracts for large quantities at 4s. 3d. per pound—a price considerably under works cost. Applications to import the German equivalent at 2s. 9d. per pound have been put in to the Licensing Committee.

Those, and many other examples which I could give, are new products on which a large amount has been spent on research and development and on the provision of plant (In the case of one important colour alone the special plant to be provided cost over £80,000). The effect of our policy has been to secure to the colour user an enormous reduction in price, which he could not have obtained in the absence of our competition. The result to ourselves has been heavy expenditure, on which we are unable to obtain any return owing to the prices which the German firms are now quoting, assisted as they are by the almost vanishing value of the mark as a medium of international currency.

The application of a three-time pre-war factor is quite insufficient to cover the cost of producing a new product, and under these conditions it is obvious that further development of the industry must come to a standstill. We suggest that colour consumers generally should agree to stabilise, for a reasonable period, the price they are willing to pay for a new British product, provided such price is not in excess of that quoted for the foreign maker prior to the introduction of the British product on the market. A strong opinion in this direction has already been expressed by an important section of colour users.

Capitalisation

Many shareholders and colour users have expressed the opinion that, in view of the heavy debit balance carried forward on trading, and of the large amount still carried in our accounts for goodwill, trade-marks and preliminary expenses, a scheme should be formulated for reducing the capital of the company. In some cases it has been further urged that, in spite of the large amounts written off to date, the book value of our fixed assets is excessive, and in the event of a reconstruction they should be still more drastically written down. I may say at once that your directors do not consider the present time opportune for considering any scheme of reconstruction. From the accounts placed before you you will see that, including the debit balance on trading account, we have in non-tangible assets a sum of something approaching £2,000,000, which will require to be dealt with in formulating any scheme of reconstruction. With regard to our fixed assets, these stand to-day in our books at a figure of under £3,500,000. Your directors will not hesitate to come before you with a scheme, when they consider the time ripe, for wiping out the heavy debit balance accumulated on trading and dealing with the value of goodwill and patent rights in respect of which deferred ordinary shares were issued to the shareholders in the merger company.

At the present time it is impossible to see far ahead and to estimate the conditions under which we will require to carry on our business in the future. For the information of the shareholders I may state that the Corporation's financial position to-day is such that, if we went into voluntary liquidation, we estimate that we have sufficient assets in cash, investments, book debts and stocks, after paying off our trade creditors, to give every preference shareholder 20s. in the pound. This could be done without taking any value for our land, buildings, plant and machinery, which have cost £7,000,000, and which, as I have already told you, stand to-day in our books at £3,500,000, or one-half their total cost. The proceeds from the disposal of these properties would be available for distribution amongst the preferred ordinary and deferred ordinary shareholders.

Progress and Prospects: A Summary

I apologise for trespassing at such length on your time and indulgence, but your directors desire to be frank in every detail, both to shareholders and consumers, and before closing I should like to summarise very briefly the position as we find it to-day.

(1) The dyemaking industry has now been definitely established in this country. (2) The quality of our production is equal to that of the best German types. (3) In conjunction with other British makers we are able to satisfy the bulk of the requirements of the colour-using industries. (4) The majority of the colours not yet made in this country are of a special type requiring not only close research, but in many instances the provision of special plants. Before makers can be induced to incur the heavy expense involved in the production of these colours there must be security against competition from foreign sources of supply. I have already suggested that consumers should in these cases agree to stabilise prices for a reasonable period. In the absence of such support you may take it that no British maker can afford to face the heavy loss which the introduction of a new colour must inevitably entail.

(5) The British industry has given to the consumer a security of supply which was lost to him in 1914, and which is enabling him to face with equanimity the present uncertainty of foreign supplies. (6) The fixing of a three-time pre-war factor as a maximum price without other compensation would ultimately involve the closing down of plants and the cessation of the manufacture of many of the more important dyestuffs placed on the market by British makers in recent years. In the main, only the cheaper grade of colours could to-day survive the test. (7) The dyestuffs industry is the only industry which, during times of peace, is capable of equipping and maintaining an adequate body of chemists trained in the methods of organic chemistry.

(8) This country has in the past built up its industrial supremacy and its national security by maintaining a lead in the iron, steel and heavy chemical industries. To maintain this position we are now compelled to take a leading part in the exploitation of the organic chemistry field. Without the protection afforded by the Dyestuffs (Import Regulation) Act the dyestuffs industry in this country, under present world conditions, could not survive. With the adherence without compensation to a price factor of the rigid nature proposed by the Colour Users' Association, its development must cease, and the industry will be slowly but surely strangled. (9) Security, with adequate safeguards against inefficiency, is essential, and we claim on the strength of our performance and resources that both the Government and the colour-using industries shall take their share in providing this security.

(10) The Corporation, and I doubt not other British dyemakers on their side, are prepared to throw the whole of their energies into the development of the industry so that they may be prepared to meet the world competition which will arise from stabilised conditions of trade and currencies.

I should like just to say a word or two to express the grateful appreciation of the Board, and also, I am sure, of the shareholders, of the devotion and labours of all our staff during the past year.

I now move "that the Report of the Directors and the Statement of Accounts for the year ended October 31, 1922, be received and approved."

Mr. Parker Smith objected to the non-disclosure in the accounts of the amount estimated to be recovered in respect of excess profits duty. He further criticised the constitution of the board as containing no representative technically competent to control the manufacture of dyestuffs, and expressed his views as a colour user on the high prices charged for the corporation's products. In his opinion, under competent management there was no need to charge more than three times the pre-war price for any colour.

The chairman, in reply, stated that the amount which had been taken credit for in respect of excess profits duty was less than the amount required to be written off for fall in stock values, and that he had already furnished a comparison between the two trading periods, excluding the amount received for refund of excess profits duty and the amount required to be written off for stock depreciation. There had been no unnecessary writing down of stocks. As the trading position was to-day, he would not be ashamed to come before them with his report next year.

The motion was adopted, and the report and accounts were passed with three dissentients.

Mr. G. V. Clay was re-elected a director, and Messrs. Thomson, M'Lintock, and Co. reappointed auditors.

A vote of thanks to the chairman, moved by Mr. H. Sutcliffe Smith (chairman of the Colour Users' Association), and seconded by Mr. G. Collis, was carried.

The New Indian Tariff

Duties on Chemicals and Dyestuffs

THE Revised Schedules of Tariff Valuations issued by the Department of Commerce of the Government of India for the purpose of levying Customs duties in British India during the nine months ending December, 1923, contain the following relating to chemicals, dyestuffs, etc. :—

CHEMICALS AND DRUGS.	Tariff Valuation. Rs. A.	Duty:
Copperas, green—		
(1) Imported in bulk (cwt.)	5 0	2½ per cent.
(2) Imported otherwise	*Ad valorem*	2½ per cent.
Opium and its alkaloids, and their derivatives (seer of 80 tolas)	—	24 rs. or 15 per cent. *ad valorem*, whichever is higher.
Cinchona Bark and the alkaloids extracted therefrom, including Quinine	..	Free.
Chemicals, Drugs and Medicines, all sorts not otherwise specified—		
Alkali, Indian (sajji-khar) (cwt.)..	4 0	15 per cent.
Alum (lump) (cwt.)	12 0	15 per cent.
Ammonium chloride—		
Muriate of Ammonia, crystalline (cwt.)	32 0	15 per cent.
Salammoniac, sublimed (cwt.) .	48 0	15 per cent.
Other sorts, including compressed (cwt.)	44 0	15 per cent.
Arsenic (China mansil) cwt.).....	85 0	15 per cent.
Arsenic, other sorts	*Ad valorem*	15 per cent.
Bleaching powder (cwt.)	13 8	15 per cent.
Carbide of Calcium (cwt.).....	20 0	15 per cent.
Carbonate of Ammonia (cwt.) ...	40 0	15 per cent.
Peppermint crystals (lb.)	19 0	15 per cent.
Silicate of soda (cwt.)	13 0	15 per cent.
Soda ash, including calcined natural soda and manufactured sesquicarbonates (cwt.)	7 0	15 per cent.
Soda bicarbonate (cwt.)	10 8	15 per cent.
Soda, caustic, solid (cwt.).....	17 8	15 per cent.
Soda, caustic, flake (cwt.)	25 0	15 per cent.
Soda, caustic, powdered (cwt.) ...	26 0	15 per cent.
Soda crystals (in bulk) (cwt.)	7 8	15 per cent.
Sulphate of copper (cwt.)	24 0	15 per cent.
Sulphur (brimstone), flowers (cwt.)	7 0	15 per cent.
Sulphur (brimstone), roll (cwt.)...	8 0	15 per cent.
Sulphur (brimstone), rough (cwt.)	6 0	15 per cent.
Trona, or natural soda, uncalcined (cwt.)	3 8	15 per cent.
All other sorts of chemical products and preparations not otherwise specified.	*Ad valorem*	15 per cent.
Camphor, refined, other than powder (lb.).	3 0	15 per cent.
Camphor, powder, from Japan (lb.)	2 4	15 per cent.
Camphor powder, from China, including Hong Kong (lb.)	1 12	15 per cent.
DYES AND COLOURS.		
Dyeing and Tanning Substances, all sorts, and Paints and Colours and Painters' Materials, all sorts—		
Alizarine dye, dry, not exceeding 40 per cent. (lb.)	1 12	15 per cent.
Alizarine dye, dry, over 40 per cent but not exceeding 50 per cent.(lb.)	2 0	15 per cent.
Alizarine dye, dry, over 50 per cent. but not exceeding 60 per cent.(lb.)	2 4	15 per cent.
Alizarine dye, dry, over 60 per cent. but not exceeding 70 per cent.(lb.)	2 8	15 per cent.
Alizarine dye, dry, over 70 per cent. but not exceeding 80 per cent.(lb.)	2 12	15 per cent.
Alizarine dye, dry, over 80 per cent. (lb.)	3 4	15 per cent.
Alizarine dye, moist, not exceeding 10 per cent. (lb.)	0 6	15 per cent.
Alizarine dye, moist, over 10 per cent. and not exceeding 16 per cent. (lb.)	0 8	15 per cent.
Alizarine dye, moist, over 16 per cent. and not exceeding 20 per cent. (lb.)	0 10	15 per cent.
Alizarine dye, moist, exceeding 20 per cent. (lb.)	1 8	15 per cent.
Aniline dye, moist (lb.)	2 4	15 per cent.
Aniline dyes, black, of sulphur series (lb.)	1 0	15 per cent.
Aniline dyes, congo red (lb.).....	1 4	15 per cent.
All other aniline dyes, dry (lb.)...	2 6	15 per cent.
Aniline salts (lb.)	*Ad valorem*	15 per cent.
Avar bark (cwt.)	4 8	15 per cent.
Cochineal (lb.)	0 14	15 per cent.
Gallnuts (myrabolams) (cwt.)	*Ad valorem*	15 per cent.
Gallnuts, Persian (cwt.)	35 0	15 per cent.
Gamboge (lb.).....	2 0	15 per cent.
All other sorts of dyeing and tanning materials	*Ad valorem*	15 per cent.
Lead, red, dry (cwt.)	27 0	15 per cent.
Lead, white, dry (cwt.)	42 0	15 per cent.
Turpentine (Imperial gallon)	8 0	15 per cent.
Vermilion, Canton (box of 90 bundles)	200 0	15 per cent.
Zinc, white, dry (cwt.)	50 0	15 per cent.
All other sorts of paints, colours, pigment ores and painters' materials not otherwise specified, including glue and putty.	*Ad valorem*	15 per cent.

Chemical Science in Industry

Sir Alfred Mond on its Advantages

NEW laboratories at Swansea University College, which have cost £65,000, were opened on Tuesday by the Mayor of Swansea, and the Right Hon. Sir Alfred Mond, M.P., delivered an address on the application of science to industry. He said that in these days of economic disturbance, of the world's impoverishment, of difficult social problems, one fact emerged more clearly than any other. If we were to regain in the financial field what we lost owing to the war it could only be by increasing the whole production of the country. We had to increase production of real commodities in relation to man-power, we had to adopt better methods of manufacture, to produce at lower cost and find new means of enriching the world. It was to the scientist, above all other men, whether he were chemist, engineer, geologist, biologist, or the follower of multifarious branches of scientific work, that we looked for help. The application of scientific inventions and scientific method, of new processes and new products, constituted the avenue of escape from our present economic dilemma. There had been no one in his experience, said Sir Alfred, who was more deeply impressed not merely with the importance of the application of science to industry, or who more fully carried his ideas into successful practice than his late father, Dr. Ludwig Mond. He treated the factory as a laboratory with the same methods of analysis, temperature control, gauging from beginning to end of the very difficult ammonia soda process which he established at Winnington in 1872.

Speaking about the process which enabled Germany to provide herself after the blockade with enormous quantities of ammonium nitrate, the chief explosive used during the war, he said that the first plant to operate this process in this country would shortly be at work on the East Coast, near Billingham, Brunner, Mond, and Co. having erected works there for this purpose. It all demonstrated the necessity of scientific research, not merely applied to any one problem, but for its own sake. Far-seeing men of business to-day had no doubt on this point. The future prosperity of the world, the solution of its economic difficulties, and the security of its teeming millions, depended far more upon its scientific progress, upon its increased power to produce wealth by the application of scientific thought and method to its industrial problems than to any other form of human effort.

A Visit to Lever Brothers' Works

HIGH praise of the industrial efficiency centred in and around Port Sunlight was expressed by a party of chemists who visited the soapworks and village on Thursday, July 5. The visitors, numbering about 300, came from all parts of the country. They constituted the final party of 6,000 of the customers of Lever Brothers, Ltd., in the British Isles, invited by the company to inspect not only the works and village of Port Sunlight, but also the margarine factory at Bromborough Port, a few miles further up the Mersey, and, incidentally, to celebrate the hundredth anniversary of the apprenticeship to the grocery trade of the late Mr. James Lever, Lord Leverhulme's father. At a luncheon, at the Hulme Hall, the chair was occupied by Mr. J. L. Ferguson, one of the directors of Lever Brothers, Ltd., and a welcome was extended the visitors by Mr. L. Hartland Swann, chairman of the Vinolia Co.

Chemical Matters in Parliament

Ruhr Occupation (Export Licences)

Major-General Sir Robert Hutchison (House of Commons, July 10) asked the President of the Board of Trade whether he was aware that British importers of lithopone from Germany who made contracts before February 1 found it almost impossible to get delivery of their goods, because the French authorities would not issue export licences, even after the payment of the French 7 per cent. duty, and that although the French authorities, under presssure, agreed to issue export licences, they in fact put every obstacle in the way of British traders receiving these licences; and would he say what he could do in the matter to protect British trade interests.

Sir P. Lloyd-Greame said that the answer to the first part of the question was in the negative. If Sir Robert Hutchison would furnish particulars of the cases he would look into the matter.

Dyestuffs

Major Attlee (House of Commons, July 10) asked the President of the Board of Trade whether he was aware that the British Dyestuffs Corporation, Limited, charged 10 per cent. commission on reparation dye-stuffs, whereas, when the distribution was undertaken by the Central Importing Agency only 2½ per cent. was charged; and would he state for what reason this high rate of commission was permitted.

Sir P. Lloyd-Greame said that he was not aware that the British Dyestuffs Corporation charged 10 per cent. commission on reparation dyestuffs, and would refer to an answer which he gave on this matter on December 4 last, to the effect that the Corporation received a commission of 6½ per cent. on the actual turnover, plus a further 1 per cent. for guaranteeing accounts, and a grant, which was limited in amount, towards the charges which they incurred relating to the importation of the dyestuffs. The Central Importing Agency undertook the duty of importing and distributing the dyestuffs for a commission of 3½ per cent., the rate to be adjusted if prices fell, but this charge proved to be inadequate, and was considerably increased, with the approval of the Treasury, by various allowances made to the Central Importing Agency upon the final adjustment of ther accounts.

Sugar-Beet

Mr. Barnes (House of Commons, July 10) asked the President of the Board of Trade whether he would submit a return to the House showing the quantity of world sugar-beet planted for the years 1922 and 1923.

Sir P. Lloyd-Greame said that the area under sugar-beet planted in the years 1922 and 1923 was: Europe, total 3,457,400 acres, Canada, 20,700 acres, and the United States, 5,360,000 acres.

Chemical Developments in Tasmania

A CORRESPONDENT of the *Times Trade Supplement* states that in Tasmania, as a subsidiary industry of the Electrolytic Zinc Company, it has been decided to lay down a plant capable of producing 50,000 tons of superphosphates a year. The raw material for the production of electrolytic zinc at Hobart is zinc concentrates produced at Broken Hill (N.S.W.), but the company, after exhaustive experiments, is now beginning work on a programme of development on the west coast of Tasmania, and a mill is to be erected at Zeehan to produce 25 tons daily of zinc concentrates for use at the company's Hobart works. These concentrates contain between 25 and 35 per cent. of sulphur, and have to be roasted to eliminate it.

Until recently the whole of the 40,000 to 50,000 tons of sulphur used in Australia annually for the manufacture of sulphuric acid and superphosphates has been imported, but the progress of the zinc industry has steadily developed the manufacture of sulphuric acid from Australian ores, and within a short period it is expected that over 30,000 tons of sulphur per annum will be used in Australia from Australian raw materials for the above purpose.

The new scheme involves the treatment of between 20,000 and 30,000 tons of zinc concentrates annually, the production of a similar quantity of sulphuric acid, the importation from Nauru and other islands in the Pacific of 25,000 to 35,000 tons annually of high-grade phosphate rock, and the manufacture therefrom of at least 45,000 tons annually of superphosphates.

Income Tax Allowances

To the Editor of THE CHEMICAL AGE.

SIR,—The demand notes now being issued in respect of second instalment of tax for the year ended April 5, 1923, should receive careful scrutiny. Taxpayers in numerous instances make overpayment simply through lack of knowledge of the reliefs to which they may make claim. They should therefore, carefully verify that all deductions have been made before payment of the second instalment. It is impossible to compress into a limited space a complete list of reliefs and deductions allowable; but the most important are:—

(1) By individuals: Personal (single), £135 or (married), £225; wife's earned income to £45, earned income tenth, children, £36 first and £27 each other, housekeeper £45, dependent relative £25, widowed mother £45, expenses incurred, first taxable £225 at half-rate, life insurance at 2s. 6d. to 5s. per £, bank or stockbrokers interest, superannuation contributions, employees earnings on actual year, relief on taxed income, adjustment on untaxed investment interest if ceased.

(2) By traders, etc.:—Loss in one trade against profits of another, cessation of business or any other specific cause (where ownership changed) for reduction of profits, successor making less profit through a specific cause, new or discontinued business making less than assessed amount, loss in trade, etc., reclaimable against any tax paid, farmers profits less than Schedule "B" assessment, wear and tear of plant and machinery, replacement of obsolete plant and machinery, gross Schedule "A" for mills, factories, etc.—Yours,

67/68, Cheapside, London, E.C.2. W. R. FAIRBROTHER.

Dyestuff Imports in June

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during June has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee.

The total number of applications received during the month was 512, of which 393 were from merchants and dealers. To these should be added the 21 cases outstanding on the 1st June, making a total for the month of 533. These were dealt with as follows:—Granted: 372 (of which 328 were dealt with within seven days of receipt). Referred to British makers of similar products: 96 (of which 78 were dealt with within seven days of receipt). Referred to Reparation supplies available: 41 (all dealt with within two days of receipt). Outstanding on June 30: 24.

Of the total of 533 applications, 436, or 80 per cent, were dealt with within four days of receipt.

Interesting Reprints

THE Wellcome Chemical Research Laboratory makes a practice of reprinting papers relating to work carried on there. We have recently received five of these reprints, which contain some twelve to twenty pages apiece, and bound in grey paper covers. They are taken from various sources, thus the *Transactions of the Chemical Society* provided the source for No. 193, "Chenopodium Oil," and No. 195, "Mercury Compounds of Hydroxy-Benzaldehydes," both by Messrs. T. A. Henry and H. Paget; No. 196, "Silver Salvarsan," by Mr. W. H. Gray. No. 192, "The Chemotherapy of Antimony," by Messrs. R. G. Fargher and W. H. Gray, is from the *Journal of Pharmacology*, while "The Constituents of the Flowering Tops of Artemsia, Afra, Jacq," (No. 194), by Mr. J. A. Goodson, is from the *Bio-Chemical Journal*.

Recovery of Fuel from Ashes in Germany

WITH the idea of reducing fuel costs, the German chemical industries have been advised to recover combustible carbon from old ash piles. The occupation of the Ruhr has resulted in such increases in fuel costs as to make it impossible to produce certain chemical products in competition with world prices. Under ordinary conditions, one-sixth of the carbon content of coal passes into the ash. The percentage is much higher in the coke used at smelters and gas plants. Under present conditions in Germany it is believed that many large ash dumps can be reworked at a profit. It also indicates the determined effort the Germans are making to keep their chemical industry alive.

From Week to Week

THE NINTH AMERICAN NATIONAL EXPOSITION of Chemical Industries will be held at the Grand Central Palace in New York City during the week of September 17 to 22, 1923.

A DEPARTMENTAL COMMITTEE to inquire into the operations of the Fertilisers and Feeding-Stuffs Act, with Lord Clinton as chairman, has been appointed by the Minister of Agriculture.

THE SULPHIDE CORPORATION, LTD., LONDON, has received from Melbourne a message announcing the outbreak of fire in their central mine, and stating that it would probably soon be under control.

AT BLACKBURN the chimney of the four-storey works of Meadowcroft and Son, Ltd., essence manufacturers, was struck by lightning on Saturday, July 7, and a mass of bricks and masonry crashed into the street below.

THE QUESTION OF THE CONSTRUCTION by Lever Brothers, Ltd., of an enclosed dock at the mouth of Bromborough Pool, a proposal which was approved by the House of Commons, is now under the consideration of a committee of the House of Lords.

DR. F. W. ASTON, in recognition of his contributions to the science of physics during the past ten years at Cambridge, was made an honorary LL.D. on Saturday, July 7, at Birmingham University Degree Congregation. It may be noted that Dr. Aston originally graduated at Birmingham.

A NUMBER of Government wood distillation factories, explosive factories, etc., are advertised for sale in the July number of *Surplus*, the official publication of the Disposal and Liquidation Commission. The present issue of this publication is announced as the last, and should be kept for reference purposes.

Dr. HANS GOLDSCHMIDT, who died recently in Germany, was the inventor of the well-known thermite process in metallurgy for reducing oxides with aluminium. He also invented an electro-chemical process for recovering tin from white iron waste. He was one of the founders of the Bunsen Society for Applied Physical Chemistry, and was for many years its president.

AT A RECEPTION held at University College, London, on Saturday, July 7, by the chairman of the London University College Committee (Viscount Chelmsford), Sir Gregory Foster (Provost of University College), and the Dean of the College Faculties, various exhibits, demonstrations, and lectures formed a part of the programme, one of the most interesting being a demonstration of the manufacture of Insulin.

FESCOL, LTD., formerly the Fletcher Electric Salvage Co., Penarth Street, Old Kent Road, London, S.E. 15, announce that they have adopted the shorter title in view of the fact that they specialise on the Fescol process for building up worn metal machinery parts of any description with hard non-corrosive metal in the cold in such a way that the deposited metal becomes welded to the original part, and sound lasting repair.

WITH REGARD to the revision of railway rates and schedules the railway companies have issued a statement explaining the reason for the delay in the proceedings of the Railway Rates Tribunal, which is due to the fact that the Traders' Co-ordinating Committee has been investigating the general figures of railway revenue in order that these may be submitted to the tribunal, and this work has taken longer than was anticipated.

THE NATIONAL GAS COUNCIL has issued to its members a circular letter drawing attention to the proposed memorial to Professor Smithells, on his vacation of the chair of Chemistry in Leeds University, pointing out his valuable services in the application of science to gas engineering, and stating that gas undertakings desiring to subscribe may send subscriptions to the National Gas Council, 30, Grosvenor Gardens, London.

THE NUMBER of persons on June 25 recorded on the live registers of the Employment Exchanges in Great Britain as wholly unemployed was 1,189,000. This was 11,634 less than in the preceding week and 296,878 less than the figure recorded on January 1, 1923. The number working short time and drawing benefit for intervals of unemployment was 60,200 on June 25, as compared with 59,214 on June 18 and 56,261 on January 1, 1923.

THE INSTITUTE of Chemistry have informed the promoters of the Pharmacy Bill, which was introduced into Parliament recently, that they wish to dissociate themselves from it, and do not wish to be concerned in the matter of the proposed central council to deal with pharmacy examinations and registration. Dr. G. C. Clayton, M.P., and Mr. C. S. Jarland, M.P., have undertaken to watch the measure in the interests of the Institute.

ON A SUGGESTION received from the Liverpool and North-Western Section, the Council of the Institute of Chemistry have considered the desirability of holding conferences from time to time in centres where sections of the Institute have been formed, and have accepted the invitation of the Liverpool section to hold the first of such conferences at Liverpool. It is hoped by this means to strengthen the professional bond between all members of the Institute.

DR. C. W. SALEEBY, the well-known writer on medical and public health matters, in an article in *The Outlook* (June 30), directed attention to the possibility of a cure for cancer in the form of a selective poison of the salvarsan type, and mentioned that this is a line of research at present mainly being investigated by the Germans. Paul Ehrlich, the original investigator in this direction, believed that the cure for cancer would ultimately be found in such a substance.

THREE MEN were suffocated and four others were taken to hospital suffering from the effects of fumes in a shaft sunk near a chemical waste heap belonging to the Bleachers' Association, at Warth, near Bury, on Wednesday. The object of the trench is to prevent chemical matter percolating into the drains. In order to construct the trench a shaft 28 feet deep has been sunk. The cause of the fatality was that the pump, used to keep the trench free of the effluent from the heap, had become choked.

A LARGE CYLINDER containing gas lying in one of the operating theatres at King's College Hospital, Denmark Hill, London, on Monday, exploded owing, it is thought, to the hot weather. The theatre was considerably damaged, and as it was equipped with all the latest operating appliances, the damage, it is estimated, will run into several hundreds of pounds. Windows in other parts of the hospital were broken, and the brass top of the cylinder was blown through the window to a room in another section of the hospital.

A MARKET REPORT received from Schütz and Co., Hamburg, states that regular commercial relations between Germany and the "hostile" countries cannot be restored until the problem of reparations is settled. Owing to the enormous rise in the cost of all articles the prices are given without engagement f.o.b. subject to a rise of 5 to 10 per cent. for broken bulk. Payment must be made by cheque or banker's credit when placing the order, as the whole capital is said to be necessary to keep the business running. In addition, the majority of prices are quoted in foreign currencies.

THE MINISTER OF HEALTH has appointed a committee to report whether the use of materials for the preservation and colouring of food is injurious to health, and, if so, in what quantities does their use become injurious; and whether it should be required that the presence of such materials and the quantities present in food offered or exposed for sale should be declared. The committee consists of Sir H. C. Monro (chairman), Professor W. E. Dixon, Sir A. D. Hall, Dr. J. M. Hamill, Mr. O. Hehner, Professor F. G. Hopkins, Dr. G. R. Leighton, Dr. A. P. Luff, Dr. C. Porter, and Mr. G. Stubbs. The secretary is Mr. A. M. Legge, of the Ministry of Health, Whitehall, London, S.W.

THE INTERNATIONAL COMBUSTION ENGINEERING CO., LTD., who are the manufacturing company for the Underfeed Stoker Co., Ltd., of London, have just completed the erection of a new engineering works at Derby. It has been designed specially for the manufacture of a wide range of underfeed stokers, both for water tube and cylindrical boilers on land and sea, the "Lapulec" ash conveyor and the many other specialities of the Underfeed Stoker Co., Ltd. The site, adjoining the London Midland and Scottish line, is just outside the town of Derby and covers 53 acres, the buildings comprising a block of drawing and general offices, a machine shop (226 ft. by 150 ft.), a foundry (262 ft. by 150 ft.), a pattern shop and pattern store, boiler house for heating purposes and transformer equipment, the whole works being electric driven with power from the Derby Corporation.

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AMMONIA.—Ammonia synthesis. The Fauser process. *Rev. Prod. Chim.*, June 30, 1923, pp. 401–404.

ANALYSIS.—Analysis and calorimetry of industrial gases. Part I. L. Maugé. *L'Ind. Chim.*, June, 1923, pp. 249–252.

DYESTUFFS.—A new class of acid dyes. A. G. Green and K. H. Saunders. *Rev. gén. des Matières Colorantes*, June, 1923, pp. 81–83.

Azo compounds of indoxyl and α-hydrazino-isatin. O. Dornier and J. Martinet. *Rev. gén. des Matières Colorantes ;* Part I., May, 1923, pp. 65–67 ; Part II, June, 1923, pp. 84–85.

Miscellaneous

REDUCTION.—Reduction of halogenates ; reduction of chlorates and iodates with arsenious acid. H. Kubina. *Monats. für Chem. (Vienna)*, January 30, 1923, pp. 439–468.

ETHERS.—Ethylene and trimethylene ethers of dioxybenzene. Parts I and II. M. Kohn. *Monats. für Chem. (Vienna)*. February 26, 1923, pp. 545–566.

ANALYSIS.—The quantitative estimation and separation of barium from strontium. R. Leo. *Monats. für Chem. (Vienna)*, February 26, 1923, pp. 567–588.

The estimation and separation of the rarer metals from other metals. Part I—The application of hydrolysis to the separation of titanium, iron and aluminium. Part II—The separation of titanium from iron and aluminium by sulphosalicylic acid. L. Moser and E. Iranyi. *Monats. für Chem. (Vienna)*, March 28, 1923, pp. 673–684.

POLYNUCLEAR COMPOUNDS.—Studies in the dinaphthanthracene series. Parts V and VI. E. Philippi and R. Seka. *Monats. für Chem. (Vienna)*, March 28, 1923, pp. 615–631.

ALDEHYDES.—Trimethylacetaldehyde. Part I. A. Franke and H. Hinterberger. *Monats für Chem. (Vienna)*, March 28, 1923, pp. 655–660.

SAPONIFICATION.—The alkali saponification of the methyl ester of the stereoisomeric tartaric acids. A. Skrabal and L. Hermann. *Monats. für Chem. (Vienna)*, March 28, 1923, pp. 633–643.

The alkali saponification of diacetyltartaric acid and its methyl ester. A. Skrabal and L. Mehr. *Monats. für Chem. (Vienna)*, March 28, 1923, pp. 645–653.

TANNING.—Contributions to the theory of vegetable tanning Part I. Dehydration of lyophylic sols and gels by tannins and its bearing on the theory of vegetable tanning. H. G. B. de Jong. *Rev. Trav. Chim. des Pays-Bas*, June 15, 1923, pp. 437–472.

Patent Literature

Abstracts of Complete Specifications

198,615. 1-PHENYL-2 : 3-DIMETHYL-4-DIMETHYLAMINO-5-PYRAZOLONE, PROCESS FOR THE MANUFACTURE OF. H. R. Napp, 7–8, Idol Lane, London, E.C.3. From Chemische Werke Altstetten, A.G., Dammstrasse, Altstetten, near Zürich, Switzerland. Application date, October 27, 1922.

It is known that 1-phenyl-2 : 3-dimethyl-4-amino-5-pyrazolone may be obtained by treating 1-phenyl-2 : 3-dimethyl-pyrazolone with nitrous acid, and reducing the nitroso compound with bisulphite, and splitting up the sulphamino compound with acid. 1-phenyl-2 : 3-dimethyl-4-amino-5-pyrazolone may be methylated by substituting formaldehyde and formic acid for the usual methylating agents such as methyl chloride or iodide. It is now found that the 1-phenyl-2 : 3-dimethyl-4-amino-5-pyrazolone which is not easily obtained pure, may be replaced by the sulphamino compound. This is treated with formaldehyde and formic acid, yielding the dimethylated compound, and the sulpho group is split up at the same time. A good yield is obtained.

198,634. AZO DYESTUFFS, MANUFACTURE OF NEW. W. Carpmael, London. From Farbenfabriken F. Bayer and Co.-Leverkusen, near Cologne, Germany. Application date, January 31, 1922.

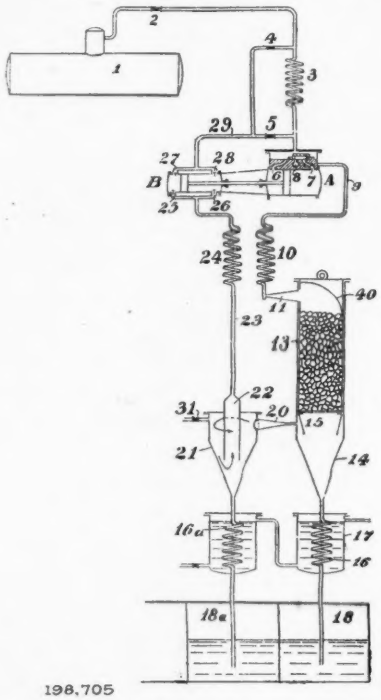
These azo dyestuffs are obtained by the combination of one molecular proportion of the tetrazo compound of 4 : 4′-diaminodiphenyl-3 : 3′-dicarboxylic acid with one molecular proportion of an aryl-2-naphthylamine and one molecular proportion of an azo dyestuff component containing a sulphonic or carboxylic group, or two hydrodroxy or two amino groups, or one hydroxy and one amino group or a hydroxy group in conjunction with the CH_2CO group of the acetoacetic anilide or of the pyrazolones. Examples of the preparation of these dyestuffs are given.

198,705. OILS, BITUMINOUS MATTER, TAR AND RESIN, PROCESS AND APPARATUS FOR THE RECOVERY OF, FROM BITUMINOUS SHALE, OIL-BEARING SANDS, BLEACHING EARTHS, PEAT, BROWN COAL, COAL AND WOOD. Plauson's (Parent Co.), Ltd., 17, Waterloo Place, Pall Mall, London. From H. Plauson, 14, Huxter, Hamburg, Germany. Application date, December 2, 1921.

The object is to distil bituminous matter and the like at a low temperature so as to obtain a good yield of low boiling products without the formation of gas. This is effected by passing superheated steam or an inert gas through a layer of the material at very high velocity—*e.g.*, above 100 metres per second. The volatile substances, such as resin, wax, bitumen, high boiling oils, etc., are carried away at temperatures below their boiling points. The organic constituents of oil shale can be obtained in almost quantitative yield, if steam superheated to about 350° C. at a pressure of 3-5 atmospheres is passed through a layer of shale of 30-50 cm. thickness. The temperature at this end of the layer is about 105°-110° C., and an oil is obtained which after distillation yields 50 per cent. of hydrocarbons of boiling point 80°-200° C. The temperature at which the steam is used may be lowered if about 1-3 per cent. of a solvent such as benzene is added.

The illustration shows a complete installation for carrying out the process. Steam is generated in a boiler 1 at 15-20 atmospheres pressure and passes through a superheater 3 to an engine *A*. The steam is exhausted at a pressure of about 10 atmospheres and passes through a pipe 9 to a superheater 10, where it is heated to about 400°-500° C. The steam then passes through a regulating valve to an expansion nozzle 11, from which it flows at very high velocity (300-500 metres per second) into a chamber 13 containing the material to be distilled. The steam is deflected downwards by a device 40 and passes through the material to a ring of openings at the bottom of the chamber. Most of the entrained oil collects in a chamber 14, and passes through a cooler 16 to a tank 18. The uncondensed steam and vapour pass through an expansion nozzle 20 to a separator 21. The vapour passes in a circular path around this separator and the separation of the oil is facilitated by centrifugal action. Impurities such as sulphuretted hydrogen may be removed by injecting a solution of a lead salt through the pipe 31. The condensate passes through a cooling pipe 16ª to a tank 18ª. The steam passes out to a superheater 34, and then to a compressor B in which it is compressed to a pressure above that of the boiler. The compressed steam passes through a pipe 20 either to the superheater 3 or direct to the engine.

In an example, Bavarian oil-shale containing 6-8 per cent. of bituminous matter is treated with steam superheated to 350°-380° C., at a pressure of 3-8 atmospheres. A crude oil with a boiling point of 140°-300° is obtained, and may be



198,705

transformed into hydrocarbons of low boiling point. If a bituminous coal which yields about 8 per cent. of tar by the usual processes is treated, a yield of about 18 per cent. of oil may be obtained. This oil contains little tar and may be converted into montan wax and low boiling oils. Peat may be treated at 375°-400° C., giving a yield of 15-17 per cent. of tar oils, and 4-6 per cent. of methyl alcohol, acetic acid, and acetone. Resinous wood may be treated so as to obtain a yield of 4-5 per cent. of turpentine, 1-1·5 per cent. of resin oil, and 17 per cent. of resin. The residue may then be treated at a higher temperature to obtain methyl alcohol, acetic acid, acetone, and tar oil. Oil-sand, bleaching earth, etc., may be treated with steam at a pressure of 30 atmospheres, but without superheating, and the whole of the organic content may be recovered. Instead of steam, other inert gases, such as carbon dioxide, may be used.

198,706. FATS AND FATTY OILS, PROCESS FOR THE PURIFICATION OF. F. Bedford, "Dovercourt," Heslington Lane, Fulford, York. Application date, December 3, 1921.

In the usual process for treating oils and fats containing free fatty acids with alkali, the residue containing the impurities (known as soap stock or foots) must be purified before its utilisation for the manufacture of soap. In the present process oils and fats are simultaneously refined and neutralised, yielding colourless oils and fats and residues of high value. The purifying agent employed is an alkaline solution, which is also an oxygen carrier, such as a solution of sodium peroxide or sodium percarbonate or a solution of caustic soda and hydrogen peroxide. In all these cases the nascent oxygen liberated is the active agent. The impurities in the fat or oil are either separated as a watery layer distinct from the oil and foots or form a suspension in the foots. In either case one

layer consists of bleached and purified oil. The limit of temperature employed is such that the oil itself is not affected by oxidation. The oil may be required to be cooled or heated according to the proportion of free fatty acid content, and the amount of heat liberated in the reaction. In an example, 1,000 kgs. of raw cottonseed oil, containing 5 per cent. of free fatty acid is treated with 85 litres of a 10 per cent. solution of sodium peroxide, the oil having an initial temperature of 16° C. The temperature rises to 37° C., and the oil is then left to separate into three layers.

198,777. GAS FROM COAL AND/OR OTHER CARBONACEOUS SOLIDS, AND/OR MATERIALS, PROCESS FOR THE MANUFACTURE OF. M. W. Travers, Waldorf Chambers, 11, Aldwych, London, W.C.2, and F. W. Clark, Fieldhead, Maltmans Road, Lymm, Cheshire. Application date, March 9, 1922.

In the process for gasifying coal in which the coal is carbonised in the upper part of a retort and the resulting coke converted into water gas in the lower part of the retort, the water gas may be passed upwards through the coal to gasify it, but it has been found that the sensible heat of the water gas, with or without practicable superheating, is not sufficient for the complete carbonisation of the coal. In this invention some of the gas leaving the upper end of the retort during a run period is forced through a regenerator which has been previously heated by the blow gas. This gas is then passed into the lower part of the carbonisation chamber of the retort. The temperature of the blow gases within the regenerator may be increased by supplying secondary air for their combustion. The quantity of hot gas passed through the carbonisation chamber is thus in excess of the quantity produced by the gasification of the coal during the same period, and the heat supplied to carbonise the coal is also in excess of the quantity of heat available from the gas generated during the same period. An apparatus for carrying out the process is described.

198,829. NEW DERIVATIVE OF PYRAZOLONE, AND NEW DYESTUFFS THEREFROM, MANUFACTURE OF. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, March 22, 1922.

A new derivative of pyrazolone—viz., 1-(2¹-methyl-3¹-sulpho-5¹-isopropyl)-phenyl-3-methyl-5-pyrazolone is obtained by converting 2 : 6-aminocymene sulphonic acid into the corresponding hydrazine by means of a sulphite, and then condensing the hydrazine with ethyl aceto-acetate. This pyrazolone is a yellow crystalline substance, soluble in alkalies but not readily soluble in water. This pyrazolone may be coupled with the diazo compound made from aniline, or other amines of the benzene or naphthalene series may be used. These acid dyestuffs give yellow shades on wool which are more reddish than those obtained from phenyl pyrazolones containing negative substituents in the 2¹ : 5¹ positions of their aromatic nuclei. These colours are similar to, but more uniform and faster to light than those obtained by means of tartrazine.

198,914. INDIA-RUBBER OR CAOUTCHOUC, TREATMENT OF. C. Marter, 42, Devonshire Chambers, Bishopsgate, London, E.C.2. Application date, June 20, 1922.

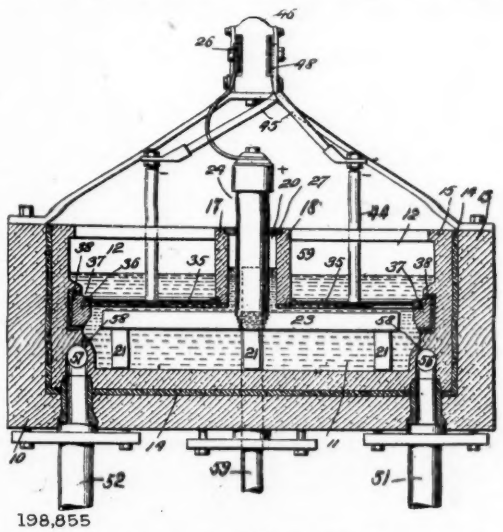
India-rubber is made plastic with the aid of a solvent such as mineral naphtha, and is then treated with a tanning extract obtained from oak or other source. The mixture is kneaded or masticated, using heat if necessary, to ensure the permeation of the tanning extract. The mixture may also be mixed with oil, fat, colouring matter, etc., which may be dissolved in water before adding to the rubber. The product is similar in appearance to leather, but is slightly plastic and may be moulded. It is soluble in many of the rubber solvents, but not in petrol. This rubber may be rendered fireproof by immersion for about one day in a solution of tin protochloride. The rubber may also be rendered stronger and more porous by treating it for about one day with a solution of alum.

198,975. CHLORINATION OF CELLULOSE MATERIAL, PROCESSES FOR DISSOLVING THE ORGANIC PRODUCTS OBTAINED BY. A. R. de Vains, 10, Rue Henri Grobon, Miribel, Ain, France. Application date, December 19, 1922. Addition to 189,561.

Specification No. 189,561 describes the treatment of chlorinated ligno-cellulose with spent alkaline lyes derived from the lixiviation of cellulose materials, with the object of dissolving the organic chlorine compounds and the oxidised organic products. In the present invention these compounds may be dissolved by means of spent lyes in which the sodium is converted into sodium carbonate or sodium sulphite by the action of carbon dioxide or sulphur dioxide, or a solution of alkali or alkaline earth bi-sulphite. The organic chlorine compounds are soluble in sodium carbonate and sulphite solutions. These organic chlorine compounds may also be dissolved by means of the solution obtained from the washing of cellulose material which has been lixiviated by alkalies. The excess of chlorine introduced during the chlorination process, and the hydrochloric acid which is also produced may be neutralised at the same time by means of alkaline lyes.

198,855. EFFECTING CHEMICAL REACTIONS BY MEANS OF AMALGAMS, APPARATUS FOR. E. C. R. Marks, London. From Royal Baking Powder Co., 135, William Street, New York. Application date, April 3, 1922.

This apparatus is of the kind in which a solution is electrolysed, yielding a metal which forms an amalgam with the lower surface of a film of mercury supported on a permeable diaphragm. The amalgam passes to the upper surface of the mercury, and reacts with another solution in contact with this surface. A tank 15 of stoneware contains the electrolytic cell 11 in its lower part, and the reduction chamber 12 in its upper



part. The tank is surrounded by reinforced concrete 13, with an intermediate layer of cement 14. Two slabs 17, 18 are arranged longitudinally in the tank, and are provided with a cover 27, thus forming an anode chamber in the upper part of which gas may be collected. A series of anodes 23 of graphite are supported on insulating blocks 21, and each is connected by a conductor 24 passing through the anode chamber 20 to a common conductor 26. The reduction chamber 12 is divided longitudinally into two parts by the gas chamber 20, and the two parts communicate by means of a compartment at one end containing a paddle, and by a discharge compartment at the other end. The chambers 11, 12 are separated by a series of shallow pans 35, which are impervious to the passage of mercury, but permeable to the electrolyte. Each diaphragm is supported in recesses 37 in inserts 38 placed along the sides of the tank. The middle of each diaphragm is depressed to receive the end of the cathode lead, which passes downwards through a glass or porcelain tube 44. All the cathodes are connected to a common conductor 48. The electrolyte is supplied through pipes 51, 52 to conduits 56, 57, provided with small apertures 58 extending throughout the length of the tank. The fresh electrolyte is thus directed along the lower surface of the diaphragms, whereby accumulation of gas is prevented. The electrolyte then passes to the gas chamber 20, and thence to the discharge pipe 21, together with any gas which is formed during the electrolysis. The solution to be treated by the amalgam is supplied to the paddle compartment at the end, and circulated through the chamber 12. In an example an electrolyte of sodium chloride may be used

and the sodium which is liberated forms an amalgam with the mercury, while the chlorine liberated passes out through the pipe 59. Oxalic acid is supplied to the chamber 12, and is acted upon by the amalgam which passes through the thin film of mercury to the upper surface. The oxalic acid is thereby converted into sodium glyoxylate. Hydrochloric acid may be added to the oxalic acid to increase the quantity of free hydrogen available for the reaction.

International Specifications not yet Accepted

197,315. ETHYL ALCOHOL AND AMMONIUM SULPHATE. Compagnie de Béthune, Bully-les-Mines, Pas-de-Calais, France. International Convention date, May 4, 1922.

Sulphovinic acid is treated with gaseous ammonia or ammonia solution, which fixes the sulphuric acid content, and sufficient heat is evolved to distil off the alcohol produced. The alcohol vapour passes to a dephlegmator and is condensed, and ammonium sulphate settles out or remains in solution in the ammonia saturation vessel.

197,319. BENZALDEHYDE AND BENZOIC ACID. Carbide and Carbon Chemicals Corporation, 30, East 42nd Street, New York; Assignees of H. R. Curme, 30, East 42nd Street, New York. International Convention date, May 4, 1922.

Dibenzyl is treated, while hot, with free oxygen to produce benzaldehyde and benzoic acid. Liquid benzyl is heated in a closed container, and air or oxygen is passed into it through a perforated pipe. The vapour passes to an air condenser, where most condenses, and the remainder then passes to a water condenser or a scrubber. The reaction may be carried out at ordinary or at increased pressures, and the dibenzyl may be employed as vapour.

197,329. CELLULOSE. A. R. de Vains, 10, Rue Henri Grobon, Miribel, Ain, France. International Convention date, May 3, 1922.

Cellulose-containing materials are treated with chlorine and the pulp is treated with alkali or alkaline earth bases or the corresponding salts of acids which are weaker than hydrochloric acid. The hydrochloric acid due to the chlorination is thus neutralised, and the chlorinated organic matter dissolved. The added materials may be in solution, in suspension or in solid form.

197,341. FRACTIONAL CONDENSATION OF VAPOUR. G. de Béthune, 151, Chaussee de Haecht, Brussels. International Convention date, May 8, 1922.

Vapour to be condensed passes into a central chamber 5, and then through outlets 11 into an annular chamber 6, and thence through outlets 12 to an outer chamber 7. The whole may be enclosed in a casing under reduced pressure, and one or

FIG.1.

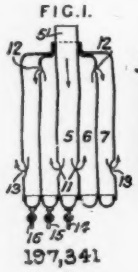
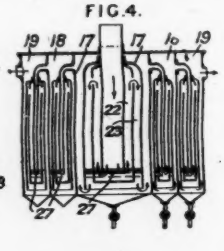


FIG.4.



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more of the condensing chambers may be provided with a jacket to maintain the desired temperature. The fractional condensates are drawn off at outlets 14, 15, 16. In a modified apparatus, the central chamber 17 may contain inner concentric chambers 22, 23, while the surrounding chambers 18, 19 contain inner concentric chambers 27. These are so arranged that the vapour passes into and through the condensate in each chamber. Each of the chambers 17, 18, 19 is provided with a separate outlet.

LATEST NOTIFICATIONS.

200,070. Process for producing mixed manure by the utilisation of distillers' wash or similar organic matters. Soc. E. Coppée et Cie. June 29, 1922.

200,081. Process for the production of solutions of metal-iodide-alkali-iodide compounds suitable for use in therapeutics. Truttwin, H. July 3, 1922.

Specifications Accepted, with Date of Application

173,750. Aliphatic hydrocarbons, Partial combustion methods for treating. C. P. Byrnes. January 6, 1921.

175,974. Hydrocarbon oils from oils, fats, or fatty acids, Method of manufacturing. Nihon Glycerine Kogyo Kabushiki Kaisha. February 25, 1921.

175,978. Peat, Method of treating. H. A. Mueller. February 26, 1921.

177,807. Nortropinone derivatives, Process for the manufacture of. E. Merck (Firm of), O. Wolfes, and H. Maeder. April 4, 1921.

180,689. Oven for distilling fuel, more particularly peat. Wessels and Wilhelmi. May 28, 1921.

181,009. New carbonyl derivatives of α-naphthol. Soc. of Chemical Industry in Basle. May 31, 1921. Addition to 172,177.

181,388. Basic magnesium carbonate, Process of the production of. Chemische Fabrik Griesheim Elektron. June 11, 1921.

182,777. Zinc furnaces. E. Horion. July 4, 1921.

189,121. Grinding Mills. Bradley Pulverizer Co. November 16, 1921.

195,585. Roasting or calcining of cement, Apparatus for. I. E. Lanhoffer. April 3, 1922.

199,475. Sulphate of ammonia, Manufacture of neutral. R. Lessing. March 24, 1922.

199,528. Tanning agents, Manufacture of. W. Moeller. April 7, 1922.

199,575. Cement, Process for the manufacture of. O. Nickel and R. Markwitz. May 25, 1922.

199,607. Sodium chloride, Process for manufacturing pure. J. T. Westermann. June 28, 1922.

199,660. Metals, Apparatus for refining or separating. H. Harris. October 19, 1922.

199,667. Dissociation of aluminiferous substances in combination with the fixation of nitrogen, Process for. V. Gerber. November 3, 1922.

199,444. Refractory linings for furnaces, and the production thereof. E. Cone and J. W. Hale. March 17, 1922.

Applications for Patents

Badische Anilin- and Soda-Fabrik, and Johnson, J. Y. Catalytic reactions. 17467. July 5.

Bone, W. A., and Finch, G. I. Process of recovering ammonia from gases or vapours. 17681. July 7.

Campbell, F. H., Clapp, F. B., and Lloyd, G. F. Manufacture of white lead. 17278. July 3. (Australia, August 30, 1922.)

Chemical Engineering Co. (Manchester), Ltd. Centrifugal machines. 17488. July 5.

Chemische Fabrik Flora. Process for producing aminobenzoyl derivatives of 1-methyl-4-diethylaminopentanol-5 and 2-methyl-4-dimethylaminopentanol-5. 17375. July 4. (Switzerland, July 14, 1922.)

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of carboxylic-acid chlorides. 17390. July 4. (Germany, July 6, 1922).

Imray, O.Y., and Soc. of Chemical Industry in Basle. Manufacture of alkaline-earth metal compounds of the organic phosphorus compound in milk casein. 17388. July 4.

Lilienfeld, L. Manufacture of cellulose solutions. 17130. July 2. (Austria, May 25).

Naamlooze Vennootschap Vereenigde Fabrieken van Chemische Producten. Method for obtaining organic super-oxides in a finely-divided condition. 17256. July 3. (Germany, July 4, 1922).

Plausen's (Parent Co.), Ltd., and Schotz, S. P. Preparation of iron oxide for purification of coal gas. 17290. July 4.

Schueler, G. R. Centrifugal separators. 17293. July 4.

Soc. Chimique des Usines du Rhône. Preparation of diethyl-chloracetamide. 17466. July 5. (Germany, January 10).

Soc. of Chemical Industry in Basle. Manufacture of sulphurised dyestuffs. 17389. July 4. (Switzerland, July 28, 1922.)

Sturtevant Mill Co. Separators. 17259. July 3. (United States, July 7, 1922.)

Young, A. E. Drying, dyeing, vulcanising, &c. 17155. July 2.

New York Demand for British Chemicals

H.M. CONSUL at New York (Mr. L. E. Bernays) reports that a local firm is desirous of purchasing the undermentioned chemicals in England, primarily for sale in Cuba:—Refined pyridine, ammonium carbonate, lump and powdered, castor oil of the No. 1 or medicinal grade, whiting (Blanco España), tartaric and citric acid, naphthalene flakes and balls. British firms desirous of receiving further particulars regarding this inquiry should apply to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, quoting reference 20039/F.W./C.C.2.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

London, July 12, 1923.

A NUMBER of chemicals have been in quiet but steady demand during the past week, but there has been some shrinkage in inquiry in some directions.

Export business is rather quieter.

General Chemicals

ACETONE is in good demand, the price is very firm and the forward tendency is distinctly evident.

ACID ACETIC.—A fair market at recent values. Stocks are on the small side.

ACID CITRIC is dearer in price and a continuance of the warmer weather might be expected to rapidly influence the market.

ACID FORMIC.—Unchanged.

ACID LACTIC.—Slow of sale.

ACID OXALIC is lower in price, due principally to the slack demand.

VARIUM CHLORIDE.—The fall in price has been arrested, although the demand remains nominal.

BLEACHING POWDER is in good demand on both home and export account—price is unchanged. Some foreign parcels are available at low figures.

CREAM OF TARTAR.—Price is still maintained and demand is steady.

FORMALDEHYDE is practically unobtainable for early delivery. The trade is waiting for the decision of the Referee as to whether the article shall remain dutiable.

LEAD ACETATE has been fairly well inquired for, the price is firm.

LITHOPONE.—A steady trade is reported without change in value.

MAGNESIUM CHLORIDE.—Unchanged.

POTASSIUM CAUSTIC.—Quiet, and the demand is slower.

POTASSIUM PRUSSIATE.—Business remains nominal in spite of slow inquiry. The recent fall in the market has made buyers shy.

SODIUM ACETATE is dearer in price. Makers are sold out for this year.

SODIUM BICHROMATE.—The English makers have the market in their own hands and the demand is fair.

SODIUM NITRITE remains in better inquiry; price is well maintained.

SODIUM PRUSSIATE is a weak market due to the entire absence of export demand.

SODIUM SULPHIDE.—Price is weak on foreign offering. Little business is about.

ZINC OXIDE.—Unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID continues in steady demand.

BROMIDES.—Unchanged. Isolated parcels being offered at cut prices.

COCAINE.—A limited quantity has been available at makers' prices. The general position would appear firm, and we expect the steady market to continue.

HEXAMINE.—Unsettled; some holders being willing to shade price.

METHYL SALICYLATE.—Easy. A fair business is reported.

PHENOLPHTHALEIN.—Spot firm and scarce. The market should be an advancing one until fresh supplies come to hand.

Coal Tar Intermediates

There is nothing of particular interest to report during the past week.

ALPHA NAPHTHOL continues in short supply, with the price very firm.

ALPHA NAPHTHYLAMINE.—Some fair orders have been placed, and the price is unchanged.

BENZIDINE BASE AND SULPHATE.—Home trade inquiries have been received.

BETA NAPHTHOL has been a small home trade business.

BETA NAPHTHYLAMINE.—Some small home inquiry.

DIMETHYLANILINE is a little easier, and home trade orders have been booked.

DIPHENYLAMINE is very firm.

METAPHENYLENEDIAMINE is steady, with some home business passing.

NAPHTHIONIC ACID.—Some fair home orders have been received.

NAPHTHIONATE OF SODA.—Good inquiries are in the market.

PARAPHENYLENEDIAMINE is unchanged.

RESORCINE.—Some small inquiry is about, and spot stocks do not seem excessive.

Coal Tar Products

There is little change to record in the prices of Coal Tar Products from last week.

90% BENZOL is still quoted at 1s. 7d. per gallon on rails in the North.

PURE BENZOL is also steady at 2s. 1d. per gallon in the North and 2s. 3d. to 2s. 4d. per gallon in London.

CREOSOTE OIL is firm at 8½d. per gallon on rails in the North, the price in London being 9d. to 9¼d. per gallon on rails.

CRESYLIC ACID has no great demand, and is worth about 2s. 1d. per gallon for the Pale quality 97/99%, while the Dark quality 95/97% is worth 1s. 10d. per gallon.

SOLVENT NAPHTHA is quietly steady at about 1s. 3d. to 1s. 4d. per gallon on rails.

HEAVY NAPHTHA has little inquiry, and is worth about 1s. 6d. per gallon on rails.

NAPHTHALENES are dull, the lower qualities being plentiful at about £6 10s. to £7 per ton, while the better qualities are worth about £9 to £10 per ton.

PITCH.—The market continues to strengthen, to-day's quotations being: London, 150s. to 152s. 6d., f.o.b.; East Coast, 145s. to 150s., f.o.b.

Sulphate of Ammonia

SULPHATE OF AMYONIA.—The position is unchanged.

[*Current Market Prices on following pages.*]

The Cost of Insulin

IN a letter to *The Times* of July 10, Sir Charles Crewe points out that the price of insulin to-day in Great Britain is 3d. a unit. Some sufferers from diabetes mellitus need sixty units daily to live, and he is informed it is being made in the United States of America at 1d. a unit. It is rumoured that the price is being maintained in England, and the importation from America restricted, to permit the British manufacturers to recoup themselves for their outlay on apparatus. The result is, he states, that really poor diabetics may die whilst the price remains prohibitive.

The following day a reply was published from Mr. G. F. McCleary, the secretary of the Insulin Committee of the Ministry of Health, stating that until a few weeks ago the American retail price, formerly higher, was 2d. per unit, or 2¼d. per unit in an alternative strength. The corresponding British retail price was 3d. per unit. The American retail price was then reduced to just over 1½d. per unit, and by a decision taken last week and made effective as from July 12, the British retail price has been reduced to approximately 2d. per unit. Hospitals, in fact, had the advantage of this reduction already during the present week. They are allowed a trade discount of 15 per cent. on the retail price, and will thus now pay about 1¾d. per unit. The main reason for the difference of price in the United States was that manufacture there began under the guidance of the workers in Toronto University, some months earlier than was possible here.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	122	10	0	to	125	0	0
Acid, Acetic, glacial, 99–100%	ton	71	0	0	to	72	0	0
Acetic, 80% pure	ton	50	0	0	to	51	0	0
Acetic, 40% pure	ton	25	0	0	to	26	0	0
Arsenic, liquid, 2000 s.g.	ton	88	0	0	to	90	0	0
Boric, commercial	ton	50	0	0	to	55	0	0
Carbolic, cryst. 39–40%	lb.	0	1	5	to	0	1	5½
Citric	lb.	0	1	8	to	0	1	8½
Formic, 80%	ton	50	0	0	to	51	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	28	0	0
Oxalic	lb.	0	0	6⅛	to	0	0	6¼
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	5	to	0	1	5½
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	32	15	0			—	
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	35	0	0	to	37	10	0
Nitrate (pure)	ton	35	0	0	to	40	0	0
Phosphate	ton	65	0	0	to	68	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate, technical	ton	225	0	0	to	260	0	0
Arsenic, white powdered	ton	73	0	0	to	75	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	15	10	0	to	16	0	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	7	6	to	10	17	6
Borax crystals	ton	27	0	0	to		—	
Calcium acetate, Brown	ton	11	10	0	to	12	0	0
Grey	ton	19	15	0	to	20	0	0
Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	100	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	27	0	0	to	28	0	0
Cream Tartar, 98–100%	ton	90	0	0	to	92	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	97	10	0	to	98	0	0
Formusol (Rongalite)	lb.	0	2	1	to	0	2	2
Glauber salts, commercial	ton	4	10	0	to	5	0	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal	0	2	2	to	0	2	3
Iron perchloride	ton	18	0	0	to	20	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	43	0	0	to	45	0	0
Carbonate (White Lead)	ton	43	0	0	to	45	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	37	0	0	to	39	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	5	0	to	4	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	6	10	0	to	7	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	50	0	0	to	55	0	0
Methyl acetone	ton	78	0	0	to	80	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	39	0	0	to	40	0	0
Ammonium sulphate, double salt	ton	39	0	0	to	40	0	0

	Per	£	s.	d.		£	s.	d.
Potash, Caustic	ton	35	0	0	to	36	0	0
Potassium bichromate	lb.	0	0	5¾	to	0	0	6
Carbonate, 90%	ton	31	0	0	to	32	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	75	0	0	to	80	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	10	to	0	0	10½
Prussiate, red	lb.	0	3	3	to	0	3	6
Prussiate, yellow	lb.	0	1	3	to	0	1	3½
Sulphate, 90%	ton	10	10	0	to	11	0	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4¾
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3¼	to	0	0	3½
Caustic, 70%	ton	19	10	0	to	20	0	0
Caustic, 76%	ton	20	10	0	to	21	0	0
Hydrosulphite, powder	lb.	0	1	5	to	0	1	6
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	27	10	0	to	28	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	1	0	to	0	1	1
Prussiate	lb.	0	0	7¾	to	0	0	8
Sulphide, crystals	ton	10	10	0	to	11	0	0
Sulphide, solid, 60–62 %	ton	16	10	0	to	17	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	10	0	to	12	10	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	2	to	0	1	3
Tin perchloride, 33%	lb.	0	1	1	to	0	1	2
Perchloride, solid	lb.	0	1	3	to	0	1	4
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	16	0	0	to	17	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	3	to	0	3	6
Acetanilid	lb.	0	1	6	to	0	1	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	0	to	0	2	6
Salicylic, B.P.	lb.	0	2	1	to	0	2	3
Tannic, leviss	lb.	0	3	3	to	0	3	6
Amidol	lb.	0	7	9	to	0	8	3
Amidopyrin	lb.	0	13	0	to	0	13	3
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	1	1	0	to	1	3	0
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	7	to	0	0	7½
Potash	lb.	0	0	6½	to	0	0	7
Soda	lb.	0	0	7½	to	0	0	8
Caffeine, pure	lb.	0	10	9	to	0	11	0
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	10	to	0	2	0
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	3	10½	to	0	4	0
Cocaine alkaloid	oz.	0	17	3	to	0	17	9
Hydrochloride	oz.	0	14	6	to	0	15	0
Corrosive sublimate	lb.	0	4	0	to	0	4	3
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	10	to	0	1	11
B.P. (75-80% eucalyptol)	lb.	0	1	11	to	0	2	0
Guaiacol carbonate	lb.	0	8	9	to	0	9	0
Liquid	lb.	0	9	6	to	0	10	0
Pure crystals	lb.	0	9	6	to	0	9	9
Hexamine	lb.	0	3	10	to	0	4	0
Hydroquinone	lb.	0	3	6	to	0	3	9
Lanoline anhydrous	lb.	0	0	7	to	0	0	7½
Lecithin ex ovo	lb.	0	17	6	to	0	19	0
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	3	to	0	2	6
Metol	lb.	0	10	6	to	0	11	6
Milk sugar	cwt.	4	2	6	to	4	5	0
Paraldehyde	lb.	0	1	6	to	0	1	9
Phenacetin	lb.	0	6	4	to	0	6	6
Phenazone	lb.	0	7	3	to	0	7	6
Phenolphthalein	lb.	0	6	9	to	0	7	0
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3			—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	5	9
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	2	9	to	0	3	0
Soda Benzoate	lb.	0	2	6	to	0	2	9
Sulphonal	lb.	0	14	6	to	0	15	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	10	6	to	0	11	0
Soda salicylate	lb.	0	7	9	to	0	8	0
Vanillin	lb.	1	3	0	to	1	4	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9	to	0	0	9½
Salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	0	to	0	3	3
Benzidine, base	lb.	0	4	9	to	0	5	0
Sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	3	0	to	0	3	3
Diphenylamine	lb.	0	3	6	to	0	3	9
H-Acid	lb.	0	5	0	to	0	5	3
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	7	6	to	0	8	6
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Nevill Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 1/10 spot	0	2	0
Bay		0	12	0
Bergamot		0	12	0
Cajaput		0	3	9
Camphor, white	per cwt.	4	0	0
Brown	„	3	15	0
Cassia	easier. c.i.f. 10/3 spot	0	12	0
Cedarwood		0	1	4½
Citronella (Ceylon)	easier	0	3	6
(Java)	very firm both spot and C.I.F.	0	4	2
Clove	dearer	0	7	0
Eucalyptus	very firm	0	1	9
Geranium Bourbon		1	10	0
Lavender		0	12	6
Lavender spike		0	3	0
Lemon		0	3	0
Lemongrass	per oz.	0	0	2½
Lime (distilled)		0	4	0
Orange sweet (Sicilian)	easier	0	13	6
(West Indian)	„	0	10	6
Palmarosa	very firm and scarce	0	19	0
Peppermint (American)	easier	0	13	0
Mint (dementholised Japanese)		0	7	0
Patchouli		1	12	0
Otto of Rose	per oz.	1	4	0
Rosemary		0	1	8
Sandalwood		1	6	0
Sassafras	dearer	0	5	6
Thyme	2/6 to	0	8	0

Synthetics.			
Benzyl acetate	0	3	0
Benzoate	0	3	0
Citral	0	10	0
Coumarine	0	18	6
Heliotropine	0	7	6
Ionone	1	5	0
Linalyl acetate	1	2	6
Methyl salicylate	0	2	6
Musk xylol	0	10	6
Terpeniol	easier	0	3	0

Aikman's Nitrate Report

In their fortnightly report on the nitrate of soda market, dated July 5, Aikman (London), Ltd., state :—

The arrivals amount to about 15,000 tons, and about 5,000 tons are due during the next fortnight. The market has continued quiet throughout the fortnight, and, apart from a steady demand for spot delivery in consuming markets, business has been at a minimum. Values are quoted about £11 15s. to £12 5s. per ton delivered in continental markets, and liner parcels for near arrival are offered at £11 15s., and for July-August shipment at £11 11s. 3d. per ton c.i.f. Values for later positions are unchanged at about £12 to £12 2s. 6d. October-November and £12 5s. to £12 7s. 6d. per ton c.i.f. for December-February shipment.

The Producers' Association have sold during the fortnight about 35,000 tons, making their total sales for shipment after July 1, 1923, 890,000 English tons, of which 150,000 tons July, 172,000 each August-September, 197,000 October, 156,000 November, 40,000 December, and 3,000 tons for February-March, 1924, delivery. The cheapest delivery date now on offer is, consequently, 20s. 7d. per metric quintal.

According to cable advice from Valparaiso, one of the Chilean producers who had not agreed to the extension of the Association to June 30, 1924, has now given his adhesion.

The shipment and production figures for June were cabled as follows :—

	1923 Tons	1922 Tons
Shipments to Europe and Egypt	76,000	6,000
„ United States	43,000	23,000
„ Japan and other countries	24,000	5,000
Production, June	153,000	72,000
Loading at July 1, for Europe and Egypt	51,000	6,000
Loading at July 1, for United States	11,000	—
Loading at July 1, for Japan and other countries	6,000	—

The summary of the position as at June 30, 1923, is thus rectified as follows :—

	1923 Tons	1922 Tons
Visible supply Europe and Egypt	171,000	228,500
„ United States	54,000	38,000
„ Japan and other countries	25,000	6,000
Stocks in Chile	1,008,000	1,601,000
	1,258,000	1,873,500

Freights have continued weak for spot liner tonnage, which has been fixed down to 20s. 6d. per ton.

Trade in June

The preliminary trading figures issued by the Board of Trade for the month of June show that for the general trade of the country the value of imports is much the same as that of May—£89,307,683 for June, as compared with £89,478,996 for May. The exports show a decline of about £9,000,000, the figures being £62,883,559 for June and £71,554,864 for May. These figures relate to the overseas trade of the country as a whole, the figures for the chemical and allied trades not being available at the moment. Next week the usual detailed analysis of the returns will be given.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, July 10, 1923.

THERE is no improvement in the position of the heavy chemical market, and little need be looked for until after the holiday, which commences this week.

Continental offers continue to be received, and prices quoted are higher than a week ago, particularly carbonate of potash and caustic potash, which have advanced about 20s. per ton.

Industrial Chemicals

ACID ACETIC, GLACIAL, 98/100%, £60 to £69 per ton. 80% pure, £49 to £50 per ton. 80% technical, £45 to £47 per ton, c.i.f. U.K. ports, duty free.

ACID BORACIC.—Crystal or granulated, £50 per ton. Powdered, £52 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, Ice Crystals.—In little request. Now quoted 1s. 2d. per lb.

ACID CITRIC.—Spot lots about 1s. 8d. per lb., but little demand.

ACID FORMIC, 80 per cent.—Unchanged at £50 per ton, ex wharf, spot delivery.

ACID HYDROCHLORIC.—Makers' price unchanged. 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£24 per ton, ex station, full truck loads.

ACID OXALIC.—Quoted 6d. to 6¼d. per lb., ex store.

ACID SULPHURIC.—144°, £3 15s. per ton, 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC.—Unchanged at 1s. 2¾d. per lb., less 5%, ex store, spot delivery.

ALUM, LUMP POTASH.—Spot lots about £11 5s. per ton, ex store.

ALUM, CHROME.—Offered at £22 to £23 per ton, according to quality, f.o.b. U.K. ports.

ALUMINA SULPHATE.—17/18% £10 10s. per ton. 14/15%, £7 10s. per ton, ex wharf, early delivery.

AMMONIA ANHYDROUS.—Now quoted 1s. 5d. per lb., ex station.

AMMONIA CARBONATE.—Lump, 4d. per lb.; ground, 4¼d. per lb delivered.

AMMONIA LIQUID, 880°.—About 3¼d. per lb., ex station.

AMMONIA MURIATE.—Grey galvanisers quality about £30 to £31 per ton. Fine white crystals, £23 15s. per ton, ex wharf, early delivery.

AMMONIA SULPHATE.—25¼%, £13 2s. per ton; 25¾%, neutral quality, £14 5s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Now quoted £75 10s. per ton, ex wharf, spot delivery.

BARIUM CHLORIDE.—98/100% inclined to be higher at £13 5s. per ton, ex wharf, early delivery.

BARYTES.—Finest white English, £5 5s. per ton, ex works.

BLEACHING POWDER.—£11 7s. 6d. per ton, ex station, spot delivery. Contracts 20s. per ton less.

BORAX.—Granulated £26 10s. per ton; crystal, £27 per ton; powdered, £28 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English make unchanged at £5 12s. 6d. per ton, ex quay or station. Continental material about £4 per ton, c.i.f. U.K.

COPPER SULPHATE.—Moderate export inquiry. Quoted £26 10s. per ton, less 5% f.o.b. U.K. port.

COPPERAS GREEN.—About £2 2s. 6d. per ton, f.o.b. U.K. port.

FORMALDEHYDE, 40%.—Quoted £92 10s. per ton, ex wharf, spot delivery. About £87 per ton, ex wharf, early shipment from Continent.

GLAUBER SALTS.—Fine white crystals quoted, £3 15s. per ton, ex store.

LEAD RED.—English makers reduce price to £40 per ton, carriage paid U.K. stations. Continental material about £36 10s. per ton, ex store.

LEAD ACETATE.—Spot material scarce. Offered from Continent at £42 per ton, c.i.f. U.K. prompt shipment.

MAGNESITE, GROUND CALCINED.—English burnt material, £8 5s. per ton, ex station. Finest Continental about £7 5s. ton, c.i.f. U.K. ports.

MAGNESIUM CHLORIDE.—Still quoted about 30s. per ton, c.i.f. U.K. Spot lots about £2 10s. per ton, ex store.

MAGNESIUM SULPHATE (Epsom Salts).—Commercial quality £7 per ton; B.P. quality, £8 5s. per ton, ex station. Continental commercial crystals quoted £4 per ton, ex store.

POTASH, CAUSTIC, 88/92%.—About £30 10s. per ton, c.i.f. U.K. ports. Spot lots £32 10s per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE.—96/98%. Now quoted £29 15s. per ton, c.i.f. U.K., 90/92%, about £27 per ton. Spot lots, £32 10s. and £28 per ton, respectively, ex store.

POTASSIUM CHLORATE.—Unchanged at about 3d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Nominally £32 per ton, ex store.

POTASSIUM PERMANGANATE.—B.P. Crystals unchanged at about 10½d. per lb., ex store.

POTASSIUM PRUSSIATE (YELLOW).—Price about 1s. 3¾d. per per lb., ex store.

SODA, CAUSTIC.—76/77%, £21 7s. 6d. per ton; 70/72%, £19 17s. 6d. per ton; 60/62 %, broken, £21 2s. 6d. per ton. 98/99%, powdered, £24 15s. per ton. All ex station, spot delivery.

SODIUM ACETATE.—Inclined to be higher at £25 10s. per ton, ex wharf.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4¼d. per lb., delivered.

SODIUM CARBONATE—(Soda Crystals). £5 to £5 5s. per ton, ex quay or station. (Alkali, 58%) £8 16s. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Commercial crystals offered from the Continent at £7 17s. 6d. per ton, c.i.f. U.K. Spot lots about £9 10s. per ton, ex store. Pea crystals quoted £15 10s. per ton, ex store.

SODIUM NITRATE.—Refined, 96/98%, about £13 7s. 6d. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRATE.—£27 to £29 per ton, basis 100%, according to quantity.

SODIUM PRUSSIATE (YELLOW).—Now quoted 7¼d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Unchanged at £4 per ton, ex station, for home consumption. Higher prices for export.

SODIUM SULPHIDE, 60/62%.—Continental material about £12 10s. per ton, c.i.f. U.K. British, quoted £16 10s. per ton, ex station.

SULPHUR.—Flowers, £10 per ton; Roll, £9 per ton; Rock, £9 per ton; Ground, £8 per ton. Prices nominal.

TIN, CRYSTALS.—Unchanged at 1s. 4d. per lb.

ZINC, CHLORIDE.—98/100% solid. Now quoted £22 15s. per ton, c.i.f. U.K. ports.

ZINC, SULPHATE.—Commercial crystals about £11 5s. per ton, ex store.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ACETANILIDE.—Export inquiry. Price 1s. 10d. per lb., f.o.b.

ANILINE OIL.—Price is firm at 10d. per lb., drums returnable.

ANILINE SALT is offered at 10d. per lb., casks free.

ANTHRANILIC ACID.—Small home inquiry. Price quoted, 8s. per lb. 100% basis.

DIPHENYLAMINE.—Large home and export inquiries. Price quoted, 3s. 6d. per lb., carriage paid, or f.o.b.

MIRBANE OIL is quoted at 8d. per lb., drums returnable.

NAPHTHA, SOLVENT, 90% at 160° C.—Supplies are available at 1s. 6d. per gallon, delivered.

ORTHO TOLUIDINE.—Export inquiry. Price 1s. 5d. per lb., f.o.b., drums included.

PHTHALIC ANHYDRIDE.—Home inquiry. Price quoted in ton lots, 2s. per lb., delivered.

SODIUM NAPHTHIONATE.—Home inquiry. Price quoted, 2s. 8½d. per lb., 100% basis, carriage paid.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, July 12, 1923.

The home demand for heavy chemicals continues on very modest lines, and, as before, orders are chiefly for spot, very little business being done for forward delivery. The Colonies are taking very fair quantities of a few of the staple lines of heavies, but trade with other overseas markets remains very quiet, and so far as indications go is likely to continue so, for the present at any rate. Prices have kept fairly steady on thewhole, and no important recessions from last week's level can be reported.

Heavy Chemicals

Sodium sulphide shows no sign of improvement in demand; the prices are unchanged at £14 10s. per ton for 60–65 per cent. concentrated solid, and £8 10s. per ton for crystals. Glauber salts likewise are inactive, but steady, at £4 per ton. Home and foreign consumers of caustic soda are still taking rather good supplies, and prices are firmly maintained at from £19 for 60 per cent. to £21 10s. per ton for 76-77 per cent. material. Bleaching powder is steady, and in moderate inquiry at £11 7s. 6d. per ton to home consumers. Saltcake is active on export account, though the home trade section is quieter with prices steady at £4 10s. per ton. Soda crystals are still quoted at £5 5s. per ton delivered, but business is only on a restricted scale. Alkali is in quietly steady demand at £7 12s. 6d. per ton for 58 per cent. material. Bicarbonate of soda is firm at £10 10s. per ton delivered to home consumers, a moderate volume of business being put through. Hyposulphite of soda is dull at £14 per ton for photographic crystals, and £10 for commercial. Nitrate of soda keeps firm at round £26 10s. per ton, with spot supplies scarce. Phosphate of soda is inactive, but prices are steady at £14 10s. to £15 per ton. Chlorate of soda is in moderate demand at 2¾d. per lb. Prussiate of soda shows little animation and prices are inclined to further weakness at 6¾d. per lb. Bichromate of soda is steady at 4¼d. per lb., sellers meeting with a fair amount of inquiry. Acetate of soda is in rather short supply, and prices are firm at £25 per ton.

A slight improvement in the demand for caustic potash is reported this week, and prices are steady at £30 per ton for 88-90 per cent. material. Carbonate of potash is also fairly active at £31 per ton for 96-98 per cent. and £28 for 90-92 per cent. Bichromate of potash is firm and in moderate inquiry at 5¾d. per lb. Yellow prussiate of potash is still very quiet, but there has been no further fall, quotations being maintained at 1s. 3d. per lb. Chlorate of potash is steady and in fair demand at 3d. to 3¼d. per lb. Permanganate of potash is quoted at 9¾d. per lb., with only a moderate amount of business being done.

Sulphate of copper is still rather quiet both for home and export, with prices unchanged at £26 to £26 10s. per ton f.o.b. Arsenic is in short supply and firm at £72 to £74 per ton for white powdered, Cornish makes. Commercial Epsom salts are being taken up in moderate quantities at £4 to £4 10s. per ton; magnesium sulphate, B.P., is on offer at round £6. Acetate of lime is scarce and very firm at £22 for grey and £11 10s. per ton for brown. Nitrate of lead is quiet but steady at £42 to £43 per ton. On continued scarcity, sugar of lead is very firmly held for available supplies at £42 both for brown and white.

Acids and Tar Products

Tartaric acid is only in quiet demand at 1s. 3¾d. to 1s. 3½d. per lb. Citric acid, B.P. crystals, is firm at 1s. 8¼d. per lb., but business is rather quiet. Oxalic acid is dull and featureless at 6d. per lb. Acetic acid maintains a strong position, with glacial quoted at £70 and 80 per cent. technical at £47 to £48 per ton.

Actual business in pitch is quiet, but inquiries are fairly numerous for delivery ahead, and current quotations are between £6 10s. and £7 per ton f.o.b. Carbolic acid meets with only a poor demand at 1s. 3d. to 1s. 3½d. per lb. for crystals and 3s. to 3s. 3d. per gallon for crude. Benzol is rather a dull section at 1s. 7d. to 1s. 8d. per gallon. The demand for naphthalenes has fallen off again, though prices are firm at about £20 to £21 per ton for flake and £7 to £13 for crude, according to quality. Solvent naphtha is very quiet, and prices are weak at round 1s. 6d. per gallon. Creosote oil is steady at about 9d. per gallon.

The Value of Phosphate Fertilisers

Lecture at Belfast

Under the auspices of the Royal Ulster Agricultural Society, an address on "Phosphates and Improvement of Pasture" was given recently at the Ulster Minor Hall, by Dr. George Scott Robertson, head of the Agricultural Chemical Research Division (Ministry of Agriculture), at Queen's University, Belfast. Mr. J. Milne Barbour, M.P., presided, and there was a good attendance.

Dr. Robertson said there could be no doubt that even at the present time a big proportion of the permanent grass land in the country was becoming poorer and poorer owing to the steady removal, by stock, of the inherent fertility of the soil. Attention was first focussed on the problem by Professor Somerville, who, no doubt, inspired by the results which Wrightson and Munro had obtained on grass land with the hitherto unknown basic slag, laid down the Cockle Park experimental station. The important point which came out of his work was the extraordinary effect which was produced on the heavy yellow clay soil by the application of phosphates in the form of basic slag. Shortly after the application of 10 cwts. of basic slag per acre to the slag plot there came a remarkable and rapid development of white clover, until, in a very short time, the wilderness was turned into a veritable paradise. The slag plot received no further dressing for nine years, at the end of which period a further 10 cwts. of basic slag per acre was applied, and that dressing had been repeated every sixth year since.

Phosphates Give Lasting Benefit

This fascinating experiment demonstrated three highly important facts—(1) phosphates had a lasting benefit; (2) it was possible to maintain the improvement by repeating the application of phosphates; and (3) even though the wild clover might tend to disappear towards the end of each period it came back with renewed vigour with each application of slag. It had been established beyond a shadow of doubt that whenever permanent pasture showed even a vestige of leguminous plants, the application of phosphates would bring about an astonishing development and an equally remarkable profit. The speaker then referred to experiments carried out by Dr. Gordon in Cheshire, where it was shown that where other clovers failed wild white clover succeeded. The Department and Ministry of Agriculture had carried out demonstration trials, and whenever phosphates were applied there had followed a phenomenal development of wild white clover, and a consequent improvement in the feeding value of the pasture. The key to the profitable improvement of permanent pasture was "apply phosphates."

W. J. Bush and Co's Annual Meeting

At the annual general meeting of W. J. Bush and Co., on Monday, Mr. J. Mortimer Bush, the Chairman, in the course of his speech said that in spite of many adverse factors the figures presented an agreeable comparison with those of the previous year. The improvement is due mainly to the fact that the depreciation in the value of their stocks which took place in 1921 was not continued into the period under review. Reductions in expenses also contributed to the result shown. No attempt to economise by reductions in wages had been made, but how long it would be possible to maintain the present rates was a matter of conjecture. Information from a reliable source showed that the standard wage of a workman in a fine chemical factory in Germany, expressed in terms of our currency at the time the information was received, was about 2½d. per hour and that of a qualified works' chemist £4 per month. They had to pay about six or seven times these rates. We could not claim any superiority over the Germans as regards efficiency. They had, however, increased the efficiency of several processes of manufacture, and it was in this direction that future prosperity must be sought.

During the latter part of the year Dr. R. C. Farmer received an invitation from the Government to resume his position at the Woolwich Research Laboratory. He felt it his duty to accept, and resigned his directorship of this company, a fact which was much regretted.

Company News

NOBEL INDUSTRIES, LTD.—The transfer books for the preference shares will be closed from July 17 to July 31, both days inclusive.

JOHN KNIGHT, LTD.—The directors announce a dividend on the 25 per cent. cumulative preferred ordinary shares, at the rate of 12½ per cent. for the half-year to May 31, payable on July 31.

THE CAPE ASBESTOS CO., LTD.—The transfer books of the preference and ordinary shares of the company were closed on July 11, and will remain closed until July 23, both dates inclusive.

CANADIAN EXPLOSIVES CO.—A dividend is announced at the rate of 1¾ per cent. for the quarter to June 30, 1923, on the 7 per cent. cumulative preferred shares, payable on July 16 to shareholders of record June 30, 1923.

AMALGAMATED ZINC (DE BAVAYS) CO.—A dividend of 1s. per share, less United Kingdom income-tax at 4s. 6d. and Federal income-tax (absentee tax) at 7d. in the £, will be paid on August 2 to all members on the London register at the close of business on July 17.

RADIUM ORE MINES.—The Radium Ore Mines Co., Ltd., met in London on Tuesday and passed resolutions in connection with the issue of £50,000 preference shares at 8 per cent., with participation in the profits after ordinary shares have received 20 per cent.

BOOTS PURE DRUG CO., LTD.—The directors have declared an interim dividend of 9 per cent. (less tax) on the new ordinary shares with respect to the quarter ended June 30, 1923. Dividend warrants will be posted on August 15 to shareholders registered on the books of the company on July 31.

DISTILLERS CO., LTD.—An extraordinary general meeting has been called for Thursday, July 19, to consider proposals to increase the share capital from £4,000,000 to £6,000,000 by the creation of 2,000,000 new shares of £1 each, and to distribute bonus shares in accordance with the scheme already announced.

WESTMINSTER BANK, LTD.—The directors of Westminster Bank, Ltd., have declared an interim dividend of 10 per cent. for the half-year ended June 30 on the £20 shares, and the maximum dividend of 6¼ per cent. on the £1 shares for the same period. The dividends, 10s. per share and 1s. 3d. per share respectively (both less income tax) will be payable on August 1.

BRITISH CYANIDES CO.—The accounts for the year to April 30 last show that the revenue profit was £17,205, and £492 was brought in, making a total of £17,697. After payment of the preference dividend for the year there is a balance of £14,847 to be carried forward. The report states that only trifling profits were earned during the first six months of the financial year, and the profits set out above were almost entirely earned during the last few months of that period. It was found possible to reopen the Tat Bank works in February last, and operations in that factory will be further extended during the next few weeks. Meeting, Cannon Street Hotel, E.C. on July 18, at noon.

MOND NICKEL CO., LTD.—The directors in their report for the year to April 30 last state that the balance sheet shows a balance to the credit of profit and loss account of £330,268, which it is proposed to deal with as follows: Interim dividend on the preference capital at 7 per cent. per annum paid March 3, 1923, less tax, £87,500; dividend now to be paid on the preference capital at 7 per cent. per annum, £87,500; interim dividend on ordinary capital of 6d. per share, paid March 3, 1923, free of tax, £22,500; dividend now to be paid on ordinary capital of 1s. 6d. per share, free of tax, £67,500; balance to be carried forward, £65,268. The demand for nickel improved during the year, and sales have been satisfactory. As a result production has been increased. The market prices for nickel and copper sulphate, which are the company's main products, have been unduly low, owing to severe competition and depreciation of foreign currencies. The directors state that the Right Hon. Sir Alfred Mond, Bart., M.P., has rejoined the board and has accepted the chairmanship of the company in place of Mr Robert Mond, who has resigned from that position. The directors have appointed Messrs. D. Owen Evans, Carl Langer, jun., Henry Mond and Philip Mond directors of the company, all of whom, as well as Sir Alfred Mond, retire under the articles of association, and, being eligible, offer themselves for re-election. It is proposed to post the dividend warrants on August 2, 1923, to shareholders on the register on July 9. Meeting, 39 Victoria Street, S.W., July 19, 12.30 p.m.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
Belgium	Shellac, fish glues and chemical products	31
Belgium	Beeswax, turpentine essence, talc, lime carbonate, calcined magnesite, etc.....	35
Czecho-Slovakia	Chemicals	37
New York	Chemical	20039/F.W./C.C.2
San Francisco ..	Coal tar products, lithopone, zinc oxide etc.	—

Tariff Changes

NEW ZEALAND.—Inorganic acids from all countries will now be free of duty. The duties on crude oils and crude greases (tariff items 569 and 583) are suspended. On the other hand, on and from September 16 duties will be imposed on empty glass bottles and glass jars at the rate of 20 per cent. *ad valorem* under the British preferential tariff, while under the general tariff the rate has been increased to 35 per cent. *ad valorem*.

German Chemical Industry Developments

RONSHEIN AND MOORE, of 11A, Wormwood Street, London, E.C.2, general agents in the United Kingdom and Colonies for the Saccharin-Fabrik, A.G., announce that in order to protect their mutual interests in the chemical industry the Upper Silesian Coke Works and Chemical Works and the Saccharin-Fabrik, Aktiengesellschaft, vorm. Fahlberg, List and Co., have agreed to work in conjunction without either firm in any way forfeiting its independent character. The arrangement for the furtherance of the companies' joint interests will be effected by an exchange of shares, and the nomination of members of the board of one company to sit on the Board of the other, and *vice versa*. The Saccharin-Fabrik, Aktiengesellschaft, will for that purpose increase their share capital by 75,000,000 marks, of which part will be given to the Upper Silesian Coke Works in exchange for a corresponding number of shares of the latter concern. The balance of the increased share capital of the Saccharin-Fabrik, A.G., will be offered to present shareholders. Dr. Berkemeyer and Dr. Bie, members of the Upper Silesian Coke Works, will join the Board of the Saccharin-Fabrik, A.G., and Dr. List, the chairman of the Saccharin-Fabrik, A.G., will join that of the Upper Silesian Coke Works.

Exploding Coal Dust Intentionally

THE Mines Department, in a letter to the Secretary of the Institution of Mining Engineers, announces that the Safety in Mines Research Board propose to arrange for a series of coal dust explosion experiments at the experimental station, Eskmeals, Cumberland, during the summer, with the object of impressing upon mine workers the importance of the coal dust problem. The Board is of opinion that as many as possible of those engaged in or interested in the coal mining industry should witness these demonstrations, and they have accordingly made arrangements for the experimental station to be open to visitors on Sundays, when a large coal dust explosion will take place, followed by another demonstration to show the efficacy of stone dust in preventing the ignition of coal dust. The demonstration will be made each Sunday from July 15 to September 30 inclusive, with a possible extension to the first two Sundays in October.

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ALIZARINE RED (all shades)

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All communications should be addressed to
The British Alizarine Co., Ltd.
Trafford Park, Manchester

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BARENDS, Mr H., 124, Warbreck Road, Blackpool, manufacturing chemist. (C.C., 14/7/23.) £26 1s. 4d. May 15.

BRITISH BOILER FLUID AND ENGINEERS STORES CO., LTD., 23, Tanner Street, S.E., chemists. (C.C., 14/7/23.) £11 1s. 11d. June 4.

LEWIS, Edward, Smithfield House, Pontardawe, boot polish manufacturer. (C.C., 14/7/23.) £37 9s. 10d. May 29.

LONDON HYGIENIC CHEMICAL CO. (1922), LTD., 5, Wine Office Court, Fleet Street, E.C. (C.C., 14/7/23.) £11 3s. 5d. April 21.

MACAULAY, Samuel, 10A, Acre Lane, Brixton, dyer. (C.C., 14/7/23.) £10 0s. 6d., May 15; and £15 15s. 4d., May 16.

MAYOUS, LTD., 170, Alum Rock Road, Birmingham, chemists. (C.C., 14/7/23.) £15 18s. 2d. May 10.

STACEY'S CASH CHEMISTS, LTD., 409, Wandsworth Road, S.W., chemists. (C.C., 14/7/23.) £15 17s. 3d. May 15.

STANSFIELD, Mr. J. L., Booth Fold, Waterfoot, chemical manufacturer. (C.C., 14/7/23.) £16 7s. 1d. May 30.

Receivership

LONDON HYGIENIC CHEMICAL CO. (1922), LTD. (R., 14/7/23.) E. C. Gardiner, A.C.I.S., A.L.A.A., of Woodridings, Cumnor Road, Sutton, was appointed Receiver and Manager on June 28, 1923, under powers contained in mortgage debenture dated March 31, 1922.

Deed of Arrangement

WEAVER, Eric Gustav, trading as WEAVERS, Clarence Street, Wolverhampton, wholesale chemists' sundriesman. (D.A., 14/7/23.) Filed July 6. Composition of 3s. 6d. in the £, payable within three months from date hereof, secured by three guarantors and by an assignment upon trust, etc. Trustee, H. B. Pearson, 52, Queen Street, Wolverhampton, C.A. Liabilities unsecured, £1,100; assets, less secured claims, £285.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

Satisfactions

DOWLING AND NEWCOMB, LTD., London, S.E., oil manufacturers. (M.S., 14/7/23.) Satisfaction registered July 2, £700 registered October 21, 1910.

INDUSTRIAL CHEMICAL CO., LTD., London, E.C. (M.S., 14/7/23.) Satisfaction registered July 4, £1,210, registered October 9, 1914.

London Gazette

Company Winding Up Voluntarily

HARGREAVES BROS. AND CO., LTD., Gipsyville, Hull. (C.W.U.V., 14/7/23.) W. G. Hall, Union Smith's Bank Chambers, Silver Street, Hull, incorporated accountant, appointed liquidator.

Notice of Intended Dividend

KEENE, Irving Alexander, described in the receiving order as The Keene Co., 52, Grays Inn Road, London, manufacturing chemists. Last day for receiving proofs, July 20. Trustee, P. S. Booth, 28, Kimberley House, Holborn Viaduct, London.

Order Made on Application for Discharge

DE CESARI, Enea, 9, Ampthill Square, Hampstead Road, London, N.W.1, manufacturer of vermin killer. (O.M.A.D. 14/7/23.) Date of Order, June 6, 1923. Bankrupt's discharge suspended for two years to June 6, 1925.

New Companies Registered

ASSOCIATED PAINT MANUFACTURERS, LTD. Manufacturers of and dealers in paints, oils, colours, varnishes, grease, soaps, etc. Nominal capital, £5,000 in £1 shares. A director: Sir Walrond Sinclair, 11, Chelsea Embankment, London, S.W.

BRITISH INTERNATIONAL INDUSTRIES, LTD., 3 and 4, Clement's Inn, London, W.C. To acquire, develop and turn to account chemical, manufacturing and other formulæ, processes, industries and patents. Nominal capital, £1,000 in £1 shares.

F. LAMPLOUGH AND CO., LTD., 25, Victoria Street, London, S.W.1. Oil and manufacturing chemists, metallurgists, engineers, etc. Nominal capital, £4,000 in 1s. shares.

OILFUEL DEPOTS (GIBRALTAR), LTD., 4, 5 and 6, Great St. Helens, London, E.C. Importers and exporters of and dealers in oil of all kinds, petroleum, benzine, etc. Nominal capital, £100,000 in £100 shares.

TARSLAG (1923), LTD. Dealers in minerals, ores and metallic substances, chemical and other by-products, etc. Nominal capital, £250,000 in 150,000 8 per cent. cumulative preference shares of £1 and 1,000,000 shares of 2s. each. A director: J. L. Major, Udimore, Rye, Sussex.

The Use of Lead in Paints

M. J. LE BRETON (France) member of the Academy of Science, formerly Minister of Health, Director of the National Office of Scientific and Industrial Research and Inventions, in a letter to *The Times*, July 10, on the use of lead in paints, states that Lord Askwith had opposed to his (M. Le Breton's) "provisional laboratory experiments" an instance of a practical test, in which lead paints lasted for twenty-five years, while paints containing no lead had disappeared after eight years.

M. Le Breton states that all his "provisional" laboratory experiments carried out sixteen years ago had since been confirmed in every detail by all the experiments made, as well as by all practical tests when these have been scrupulously carried out and rigorously controlled. He adds, any practical test in which measures were not taken to ensure that the oil used in the manufacture of the different paints was of exactly the same quality should be dismissed at once as untrustworthy.

Lead is a formidable poison, not only pernicious in its effects upon painters, but equally dangerous to the public; and secondly, that there should be no difficulty or inconvenience of a technical nature in replacing for paintwork this poison by certain of its numerous harmless substitutes.

In these conditions, adds M. Le Breton, to continue automatically to cover the walls of our apartments with so deadly a poison is an incomprehensible absurdity, a veritable challenge to common sense.

Waterproof Cements

In connection with the study of development problems in the Tonkawa oilfield, in the United States, laboratory tests of cements and mud fluids used in the exclusion of water from oil wells are being made by the American Department of the Interior, through the Bureau of Mines. The time of initial and final set, and the viscosities and specific gravities of four brands of cement mixed with different proportions of water are being determined. Penetration tests have been made on sandstone, using mud fluid of 1·1 specific gravity. Laboratory tests will be made to determine the amount of penetration of mud fluids of different gravities into unconsolidated sands.